RADIAN CORPORATION

FINAL REPORT

AIR QUALITY ANALYSIS OF
THE INDIVIDUAL PROPOSED ACTIONS

VOLUME 1

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FINAL REPORT
AIR QUALITY ANALYSIS OF THE INDIVIDUAL PROPOSED ACTIONS

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1.0 INTRODUCTION

This volume presents the air quality assessment of the individual proposed actions for the environmental statement of the Star Lake - Bisti Environmental Study region.. The analysis for each proposal is presented in a separate chapter. Each chapter includes a discussion of the essential components of environmental statements excluding a description of the proposed action and alternatives to the proposed action. The Air Quality Impact of the Proposed Actions is assessed for the sites assuming that the proposal is operating at its maximum capacity anticipated for the proposal action and in the mode that generates maximum pollutant emissions.

2.0 THE SURFACE AND UNDERGROUND MINES AND LOADING FACILITIES OF AMCOAL, INC.

2.1 Description of Air Quality

The nearest ambient air quality monitor applicable to the site of the proposed action is the town of Zuni. Only total suspended particulates (TSP) were monitored. The annual geometric mean for 1975 was 24.4 micrograms per cubic meter ($\mu g/m^3$) and for 1976 was 39.8 $\mu g/m^3$. The 24-hour maximum concentrations were 80.1 $\mu g/m^3$ in 1975 and 94.1 $\mu g/m^3$ in 1976. These levels are well below federal and state standards. Ambient concentrations of the other federally regulated air pollutants may be assumed to be the same as measured at other sites throughout the E.S. region, which are all well below federal secondary standards.

The annual and 24-hour average concentrations representative of the background concentration at the Amcoal mines is 32 $\mu g/m^3$. The background concentrations of other pollutant, as well as the air quality monitoring data representative of this site, are discussed in detail in Section 2.1.2 of Volume 2 of the Regional Assessment of Air Quality. The visibility applicable to the Amcoal mines is presented in Volume 3, Discussions of Climatology of the Individual Proposed Actions.

2.2 Air Quality Impact of the Proposed Actions

2.2.1 Emissions

To predict the air quality impact of the proposed Amcoal's Surface and Underground Coal Mines, emissions from all facets of the proposed mining and support activities must be determined. These emissions can then be expressed as ambient

air pollutant concentrations by mathematical modeling of emission rates, source geometry and meteorological conditions.

The only significant emissions from the Amcoal's Surface and Underground Mines would be particulate matter generated by wind erosion and by mining activities. Emissions of gaseous pollutants from fuel combustion sources (vehicles and generators) would be very small and would not increase background levels measurably. Emissions from blasting and from unexpected ignition of coal fires would not be significant. In addition, emissions from activities during the construction phase would be intermittent and not significant. These emissions would be much lower than those generated by mine operation.

Particulate emissions would be generated by the surface and underground mining activities during the life of the mine (1980-1990) by the following activities:

1. Mining: including vehicular-generated dust and wind erosion of the mining pit, overburden piles, and other unvegetated land.*

2. Coal Storage: loading, unloading, and wind erosion of the coal storage pile.

3. Coal Preparation and Processing: crushing, grinding, sorting, screening, drying.

4. Haul Road Dust

Emission estimates were not provided by Amcoal, Inc., but were calculated by methods discussed in Appendix A of the

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* Surface mine only.

Regional Assessment. Total emissions calculated by these methods are presented in Table 2-1. The numbers presented in this table are total annual particulate emissions calculated for surface mining. Particulate emissions generated by the surface mine would be greater than those generated by the underground mine.

TABLE 2-1

SUSPENDED PARTICULATE EMISSIONS RESULTING FROM THE OPERATION OF THE SUNDANCE SURFACE COAL MINES - AMCOAL

Activity	Emission (Tons/Year)
Haul Road Dust	2
Coal Processing	11
Coal Storage	66
Surface Mining	1146
Total	1225

2.2.2 Resultant Air Quality

The potential air quality impacts of the Amcoal, Inc. Surface and Underground Mines were assessed by determining ambient total suspended particulate (TSP) concentrations which would result from the mines' emissions. Short-term, intermediate-term and long-term atmospheric dispersion models were applied to emissions from the mine site to determine TSP concentrations for 24-hour, 7-day, 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

The emissions from certain types of sources within the proposed mining complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon

monoxide, nitrogen oxides and sulfur oxides) from intermittent mine sources such as vehicles and generators would not be significant. In addition, emissions from blasting and fires would be insignificant because of their sporadic nature. Although pollutant levels resulting from fires might be substantial the potential for their occurrences is difficult to predict, and there is difficulty in quantifying these emissions.

Table 2-2 presents federal and New Mexico ambient particulate standards, estimated background particulate levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual TSP levels resulting from total mine emissions. Maximum concentrations presented in this table are the highest TSP levels expected outside the mine boundary.

Examination of Table 2-2 shows that all federal standards for the 24-hour averaging period and the New Mexico 24-hour and 7-day standards would be violated. Highest concentrations are predicted to occur within the surface mine boundary and concentrations reported in Table 2-2 are those predicted to occur at the surface mine boundary. Assuming that the mine pit and disturbed land lie near the center of the area proposed by Amcoal, Inc. for surface mining, the mine boundary would be approximately 0.3 km downwind from the pit. Maximum concentrations for all averaging times decrease rapidly with distance and concentrations would drop below levels specified in federal and New Mexico standards beyond 1.3 km from the mind boundary. However, 24-hour average TSP concentrations at the boundary of the loading facility approximately 10 km NNE of the surface mine would reach 460 $\mu g/m^3$, and exceed all federal and New Mexico standards. Concentrations would drop below standard levels with 0.3 km of the loading facility. The decrease of maximum 24-hour average TSP concentration with distance is presented in Figure 2-1.

TABLE 2-2

AIR QUALITY IMPACT OF THE AMCOAL, INC. SURFACE AND UNDERGROUND MINES

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1]		New Mexico[2]				
	Primary	Secondary					
Annual	75	60	60	32	0.3 km	4	36
30-day	-	-	90	32	0.3 km	7	39
7-day	-	-	110	32	0.3 km	364	396
24-hour	260	150	150	32	0.3 km	663	695

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3]As measured from the mine pit.

[4]Including background.

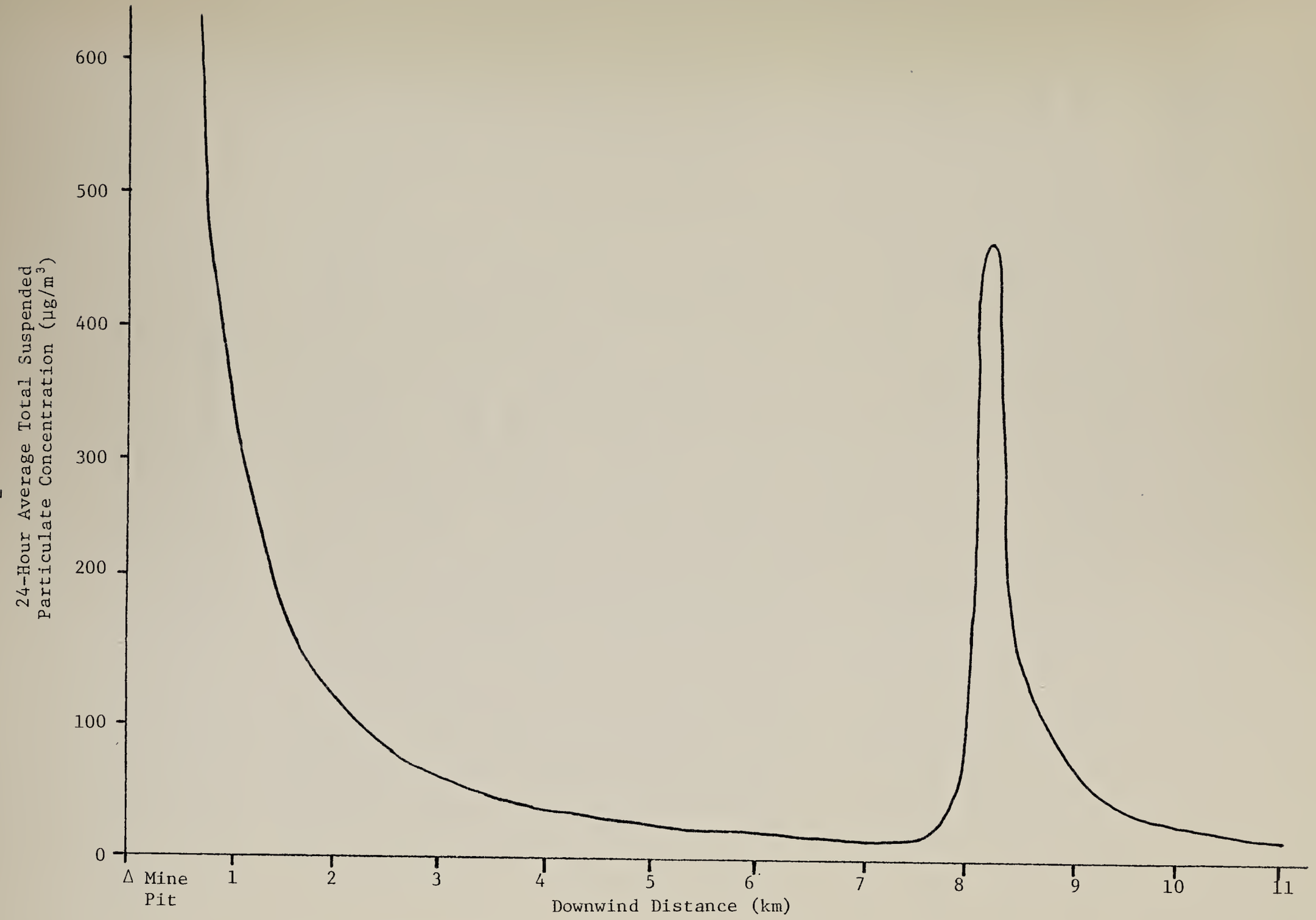

Figure 2-1. Maximum 24-hour Average Concentrations of Total Suspended Particulates Downwind from the Surface Mine of Amcoal, Inc.

Concentrations presented in this figure do not include the background contribution.

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively, in Class II areas (the entire United States is currently designated Class II). Modeling results show that the 24-hour level would be exceeded out to a downwind distance from the surface mine boundary of 4.0 km. The annual level of 10 $\mu g/m^3$ would not be exceeded beyond the mine boundary.

Meteorological conditions associated with highest 24-hour and 7-day TSP levels are those which cause the greatest amount of wind-generated dust. These conditions typically include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollutant meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during these conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data from Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 - 2 times per year.

Increased TSP concentrations resulting from particulate emissions from the Amcoal mining operation would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind

through the dispersing plume. However, the general visibility reduction within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentrations, the normal regional visibility on an otherwise clear day would be about 40 km.

2.3 Mitigating Measures

2.3.1 Measures Required by Law or Regulation

The most significant degradation of air quality which would be caused by the proposed surface and underground mines would occur for total suspended particulates (TSP). The control of particulate matter from coal burning equipment and from mining and preparation plants is specified by New Mexico Health and Social Services Board regulations numbers 401, 504, and 672. Some of the controls for "fugitive" particulate emissions from coal mining and preparation plants specified in Regulation 672 include:

1. The installation of hoods, shields, or sprays on all crushers, conveyors, screens, cleaners, hoppers, and chutes, necessary to prevent particulate matter from becoming airborne.

2. The spraying or other treatment of main coal hauling roads.

The U.S. Department of Interior has also established regulations controlling the operation of coal mining (43 CFR, Subpart 3041.1:2(b)(2)(v). These regulations require the applicant to describe in detail the strategies which he will apply for controlling emission of air pollutants. Major aspects of the regulation is the control of fugitive particulate emissions

by revegetation. In the long-term, revegetation and land reclamation can be nearly 100 percent effective in controlling fugitive particulate emissions. The short-term control will rely on measures such as size and timing of blasting and procedures for preventing fires which will be specified by the applicants. It is difficult, however, to estimate the efficiency of these controls.

The U.S. Department of Interior, USGS, has promulgated rules and regulations for controlling of emissions for coal mining (30 CFR 211). To comply with these regulations and rules, an applicant must enumerate in detail the control measures that would be applied for blasting, fire prevention, and controlling wind erosion. To ensure the maintenance of ambient air quality standards, monitoring of air pollutant concentrations is also required. The fugitive dust emissions from construction are required to be controlled in the short-term by washing, wetting down, or otherwise treating or covering vehicles, road, and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading. In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives would control fugitive dust emissions.

In addition, the New Mexico State Bureau of Mines and Mineral Resources has established the "Regulations of the Coal Surfacemining Commission Pursuant to New Mexico Coal Surfacemining Act" Chapter 68, Laws 1972, dated January 3, 1973. These regulations require that the disturbed areas be revegetated.

2.3.2 Other Mitigating Measures

The major air quality impact would be expected from fugitive dust emissions from surface mining and surface activities of the underground mine. Predicted levels of total

suspended particulates (TSP) would exceed the national 24-hour standards and the New Mexico 24-hour and 7-day standards outside the mine sites.

Fugitive dust may be minimized by watering at transfer points, such as conveyor ends or loading stations. Dust collection systems may be installed over coal treatment sources such as crushers and sorters. Attention to cleanliness and accidental spill prevention would reduce fugitive dust emissions.

The most significant long-term mitigating measure for fugitive dust would be the immediate reclamation of mined surfaces. As mining proceeds, previously mined areas would not continue to be a source of emissions. Reclamation would include grading, seeding, vegetation planting, landscaping, and other mitigating alternatives.

Blasting operations unavoidably force particulates into the atmosphere but the detrimental effects can be minimized by careful blast design so as to reduce the amount of very small particles that would linger. This can be accomplished by proper sequencing and limiting the amounts of explosive. Coal fires as a potential pollutant source can be largely prevented by careful design of overburden piles and other preventive action. Prompt and thorough fire fighting in the case of accidental fire can prevent a major pollution problem.

A continuous air monitoring program can be employed to determine background concentrations of TSP and measure the success of abatement programs.

Particulate levels associated with vehicular traffic can be minimized by attention to cleanliness of vehicles, wetting down areas of potential fugitive emissions, and by restricting unauthorized use of access roads.

Non-methane hydrocarbon (NMHC) emissions are primarily the result of transportation sources and solid waste disposal. Open burning should be minimized and regular inspection and maintenance of light duty vehicles and their emission control devices would reduce NMHC and oxidant levels. Hydrocarbon (HC) control devices should be considered for the off-the-road vehicles.

2.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emissions of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the construction and operation of surface and underground mines, and coal handling facilities would be controlled with dust suppression systems and other procedures including land reclamation and revegetation, wetting of road surfaces, and special blasting techniques. There would be unavoidable fugitive dust emissions from off-road vehicles although they would be rigorously controlled by watering. Even though the fugitive dust emissions would be stringently controlled at the surface and underground mines, the violation of the federal and New Mexico suspended particulate standards would be unavoidable in the vicinity of the property boundaries of the mines.

A loss of visibility resulting from very fine particulate emissions would occur near the mines. The decrease in visibility to the region as a whole due to the rise in fugitive emissions would not be significant.

2.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

The major source of degradation of the short-term air quality would be the emissions of fugitive dust from coal mining, transporting, and handling. Fugitive dust would be entrained into the atmosphere by wind erosion of the coal storage area, and unreclaimed areas, by off-road vehicles, by transport of the coal, and by the cleaning, processing, and loading of coal.

These fugitive emissions would reduce visibility. Because the residence time of the particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the surface and areas disturbed for mining is not equivalent to the current vegetation and surface contours, pollutant dispersion patterns of the area would be permanently altered.

2.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at mines may cause a small change in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered.

3.0 THE SURFACE MINE OF CARBON COAL COMPANY

3.1 Description of Air Quality

The nearest ambient air quality monitor applicable to the site of the Carbon Coal Company's Surface Mines action is the town of Zuni. Only total suspended particulates (TSP) have been monitored. The annual geometric mean for 1975 was 24.4 $\mu g/m^3$ and in 1976 was 39.8 $\mu g/m^3$. The 24-hour maximum concentrations were 80.1 $\mu g/m^3$ in 1975 and 94.1 $\mu g/m^3$ in 1976. These levels are well below federal and state standards. Ambient concentrations of the other federally regulated air pollutants may be assumed to be the same as measured at other sites throughout the E.S. region which are all well below federal secondary standards.

The annual and 24-hour average concentration representative of the background concentration at the Carbon Coal Company's mines is 32 $\mu g/m^3$. The background concentrations of other pollutants as well as the air quality monitoring data representative of this site are discussed in detail in Section 2.1.2 of Volume 2 of the Regional Assessment of Air Quality. The visibility applicable to the Carbon Coal mines is presented in Volume 3, Discussions of Climatology of the Individual Proposed Actions.

3.2 Air Quality Impact of the Proposed Actions

3.2.1 Emissions

To predict the air quality impact of the proposed Carbon Coal Company's Gamerco Surface Mine, emissions from all facets of the proposed mining and support activities must be determined. These emissions can then be expressed as ambient

air pollutant concentrations by mathematical modeling of emission rates, source geometry and meteorological conditions.

The only significant emissions from the Gamerco Mine would be particulate matter generated by wind eriosion and by mining activities. Emissions of gaseous pollutants from fuel combustion sources (vehicles and generators) would be very small and would not increase background levels measurably. Emissions from blasting and from unexpected ignition of coal fires would not be significant. In addition, emissions from activities during the construction phase would not be significant because of their intermittent nature. These emissions would be much lower than those generated by the mine operation.

Particulate emissions would be generated during the life of the mine (1979-1990) by the following activities:

1. Mining: including vehicular-generated dust and wind erosion of the mining pit, overburden piles, and other unvegetated land.

2. Haul Road Dust.

3. Coal Storage: loading, unloading, and wind erosion of the coal storage pile.

4. Coal Preparation and Processing: crushing, grinding, sorting, screening, drying.

Emission estimates were not provided by Carbon Coal Company but were calculated by methods discussed in Appendix A of the Regional Assessment. Total emissions calculated by these methods are presented in Table 3-1. The numbers presented in this table are total annual particulate emissions.

TABLE 3-1

SUSPENDED PARTICULATE EMISSIONS RESULTING FROM THE OPERATION OF THE GAMERCO SURFACE MINE - CARBON COAL COMPANY

Activity	Emission (Tons/Year)
Coal Processing	245
Coal Storage	33
Mining	5361
Haul Road Dust	197
Total	5836

3.2.2 Resultant Air Quality

The potential air quality impacts of the Carbon Coal Company Gamerco Coal Surface Mine were assessed by determining ambient total suspended particulate (TSP) concentrations which would result from the mines emissions. Short-term, intermediate-term and long-term atmospheric dispersion models were applied to emissions from the mine site to determine TSP concentrations for 24-hour, 7-day, 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

Emissions from certain types of sources within the proposed mining complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon monoxide, nitrogen oxides, and sulfur oxides) from on and off mine sources such as vehicles and generators would not be significant. In addition, emissions from blasting and fires

would be insignificant because of their sporadic nature. Although pollutant levels resulting from fires might be substantial, there is difficulty in quantifying these emissions and the potential for their occurrences is difficult to predict.

Table 3-2 presents federal and New Mexico ambient particulate standards, estimated background particulate levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual TSP levels resulting from total mine emissions. Maximum concentrations presented in this table are the highest TSP levels expected outside the mine boundary.

Examination of Table 3-2 shows that no state or federal ambient air quality standards should be violated beyond the mine boundary (2.9 km from the mine pit). Highest concentrations are predicted to occur within the mine boundary and concentrations reported in Table 3-2 are those predicted to occur at the boundary. The decrease of maximum 24-hour average TSP concentrations with distance is presented in Figure 3-1. Concentrations presented in this figure do not include the background contribution.

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively, in Class II areas (the entire United States is currently designated Class II). Modeling results show that these levels would be exceeded out to downwind distances from the mine boundary of 1.5 km for the 24-hour case. The annual level of 10 $\mu g/m^3$ would not be exceeded.

Meteorological conditions associated with highest 24-hour and 7-day TSP levels are those which cause the greatest

TABLE 3-2

AIR QUALITY IMPACT OF THE CARBON COAL COMPANY GAMERCO SURFACE MINE

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1]		New Mexico[2]				
	Primary	Secondary					
Annual	75	60	60	32	2.9	7	39
30-day	-	-	90	32	2.9	12	44
7-day	-	-	110	32	2.9	30	62
24-hour	260	150	150	32	2.9	55	87

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3]As measured from the mine pit.

[4]Including background.

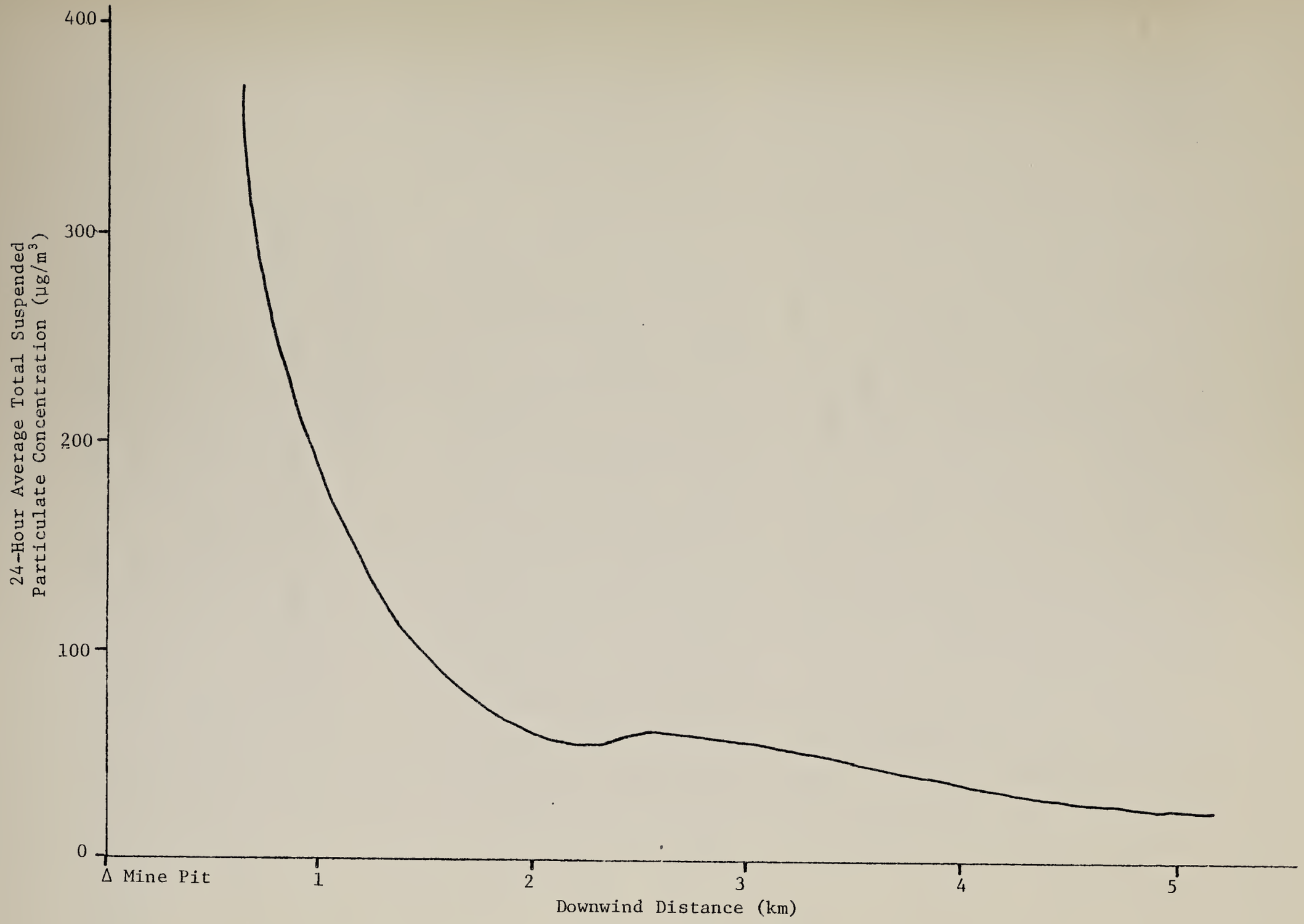

Figure 3-1. Maximum 24-hour Average Concentrations of Total Suspended Particulates Downwind from the Surface Mine of Carbon Coal Company

amount of wind-generated dust. These conditions typically include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollutant meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during these conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data for Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 - 2 times per year.

Increased TSP concentrations resulting from particulate emissions from the Carbon Coal Company mining operation would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind through the dispersing plume. However, the general visibility reduction within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentrations, the normal regional visibility on an otherwise clear day would be about 40 km.

3.3 Mitigating Measures

3.3.1 Measures Required by Law or Regulation

The most significant degradation of air quality which would be caused by the proposed surface mine would occur for total suspended particulates (TSP). The control of particulate matter from coal burning equipment and from mining and preparation plants is specified by New Mexico Health and Social Services Board

regulations numbers 401, 504, and 672. Some of the controls for "fugitive" particulate emissions from coal mining and preparation plants specified in Regulation 672 include:

1. The installation of hoods, shields, or sprays on all crushers, conveyors, screens, cleaners, hoppers, and chutes, necessary to prevent particulate matter from becoming airborne.

2. The spraying or other treatment of main coal hauling roads.

The U.S. Department of Interior has also established regulations controlling the operation of coal mining (43 CFR, Subpart 3041.1:2(b)(2)(v). These regulations require the applicant to describe in detail the strategies which he will apply for controlling emission of air pollutants. Major aspects of the regulation is the control of fugitive particulate emissions by revegetation. In the long-term, revegetation and land reclamation can be nearly 100 percent effective in controlling fugitive particulate emissions. The short-term control will rely on measures such as size and timing of blasting and procedures for preventing fires which will be specified by the applicants. It is difficult, however, to estimate the efficiency of these controls.

The U.S. Department of Interior, USGS, has promulgated rules and regulations for controlling of emissions from coal mining (30 CFR 211). To comply with these regulations and rules, an applicant must enumerate in detail the control measures that will be applied for blasting, fire prevention, and controlling wind erosion. To ensure the maintenance of ambient air quality standards, monitoring of air pollutant concentrations is also required. The fugitive dust emissions from construction

are required to be controlled in the short-term by washing, wetting down, or otherwise treating or covering vehicles, road, and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading. In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives would control fugitive dust emissions.

In addition, the New Mexico State Bureau of Mines and Mineral Resources has estimated the "Regulations of the Coal Surfacemining Commission Pursuant to New Mexico Coal Surfacemining Act" Chapter 68, Laws 1972, dated January 3, 1973. These regulations require that the disturbed areas be revegetated.

3.3.2 Other Mitigating Measures

The major air quality impact would be expected from fugitive dust emissions from surface mining. Fugitive dust may be minimized by watering at transfer points, such as conveyor ends or loading stations. Dust collection systems may be installed over coal treatment sources such as crushers and sorters. Attention to cleaniness and accidental spill prevention would also reduce fugitive dust emissions.

The most significant long-term mitigating measure for fugitive dust would be the immediate reclamation of mined surfaces. As mining proceeds, previously mined areas would not continue to be a source of emissions. Reclamation would include grading, seeding, vegetation planting, landscaping, and other mitigating alternatives.

Blasting operations unavoidably force particulates into the atmosphere but the detrimental effects can be minimized by careful blast design so as to reduce the amount of very small particles that would linger. This can be accomplished by proper

sequencing and limiting the amounts of explosive. Coal fires as a potential pollutant source can be largely prevented by careful design of overburden piles and other preventive action. Prompt and thorough fire fighting in the case of accidental fire can prevent a major pollution problem.

A continuous air monitoring program can be employed to determine background concentrations of TSP and measure the success of abatement programs.

Particulate levels associated with vehicular traffic can be minimized by attention to cleanliness of vehicles, wetting down areas of potential fugitive emissions, and by restricting unauthorized use of access roads.

Non-methane hydrocarbon (NMHC) emissions are primarily the result of transportation sources and solid waste disposal. Open burning should be minimized and regular inspection and maintenance of light duty vehicles and their emission control devices would reduce NMHC and oxidant levels. Hydrocarbon (HC) control devices should be considered for the off-the-road vehicles.

3.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emissions of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the construction and operation of surface mines and coal handling facilities would be controlled with dust suppression system and other procedures including land reclamation and re-vegetation, wetting of road surfaces, and special blasting techniques. Fugitive dust emissions from off-road vehicles would

be unavoidable although they would be rigorously controlled by watering. Even though the fugitive dust emissions would be stringently controlled at the surface mines, the violation of the suspended particulate standards for Class II areas would be unavoidable in the vicinity of the property boundaries of the mines.

A loss of visibility would result from the emission of very fine particulates to the atmosphere. The decrease in regional visibility would not be significant.

3.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

The major source of degradation of the short-term air quality would be the emissions of fugitive dust from coal mining, transporting, and handling. Fugitive dust would be entrained into the atmosphere by wind erosion of the coal and spoil storage area, and unreclaimed areas, by off-road vehicles, by the transport of the coal, and by the cleaning, processing, and loading of coal.

These fugitive emissions would reduce visibility. Because the residence time of the particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the surface mines is not equivalent to current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

3.6 Irreversible or Irretrievable Commitment of Air Quality

The distribution of material at the mine may cause a small change in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result,

localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered.

4.0 THE EXTENSION OF THE SAN JUAN MINE BY WESTERN COAL COMPANY

4.1 Description of Air Quality

The available air quality monitoring data from the nearby monitoring stations in Kirtland and at the El Paso Natural Gas Plant (San Juan River site) best characterize conditions at the Western Coal Company Underground Mine site. The data indicate that the federal secondary 24-hour maximum concentration (TSP) is currently being exceeded. The standard must be violated twice annually to constitute a violation. The 24-hour maximum concentration in 1976 in Kirtland was 219 $\mu g/m^3$ and at the El Paso Natural Gas Plant the concentration was 275.3 $\mu g/m^3$. In 1976 the annual secondary TSP standard of 60 $\mu g/m^3$ was violated at both monitoring sites. In Kirtland the annual TSP concentration was 80.9 $\mu g/m^3$ and at the El Paso Natural Gas Plant the annual average was 68.8 $\mu g/m^3$. The average for two years (1975-76) for both sites was 55 $\mu g/m^3$ and is the background TSP concentration for the Western Coal Mine site.

Sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) were also monitored in Kirtland in 1976. The 24-hour SO_2 maximum concentration of .039 ppm is well below the state standard of .10 ppm and the annual average of .012 ppm is also below the standard of .02 ppm. The 24-hour NO_2 maximum concentration of .0363 ppm is well below the state standard of .10 ppm and the annual average of .0129 ppm is below the state standard of .05 ppm.

The background concentration of other regulated pollutant concentrations are assumed to be well below federal and state limits as described in Volume 2 of the Regional Assessment of the

Air Quality. The visibility applicable to the Western Coal Company Underground Mine site is summarized in Volume 3 of the Discussions of Climatology of the Individual Proposed Actions.

4.2 Air Quality Impact of the Proposed Actions

4.2.1 Emissions

To predict the air quality impact of the proposed Western Coal's San Juan Underground Coal Mine, emissions from all facets of the proposed mining and support activities must be determined. These emissions can then be expressed as ambient air pollutant concentrations by mathematical modeling of emission rates, source geometry and meteorological conditions.

The only significant emissions from the San Juan Mine would be particulate matter generated by wind erosion and by coal processing activities. Emissions of gaseous pollutants from fuel combustion sources (vehicles and generators) would be very small and would not increase background levels measurably. Emissions from blasting and from unexpected ignition of coal fires would not be significant. In addition, emissions from activities during the construction phase would be intermittent and not significant. These emissions would be much lower than those generated by the mine operation.

Particulate emissions would be generated during the life of the mine (1980-2020) by the following activities:

1. Coal Storage: loading, unloading, and wind erosion of coal storage pile.

2. Coal Preparation and Processing: crushing, grinding, sorting, screening, drying.

Emission estimates were not provided by Western Coal Company but were calculated by methods discussed in Appendix A of the Regional Assessment. Total emissions calculated by these methods are presented in Table 4-1. The numbers presented in this table are total annual particulate emissions.

TABLE 4-1
SUSPENDED PARTICULATE EMISSIONS RESULTING FROM THE OPERATION OF THE SAN JUAN UNDERGROUND MINE - WESTERN COAL

Activity	Emission (Tons/Year)
Coal Processing	36
Coal Storage	234
Total	270

4.2.2 Resultant Air Quality

The potential air quality impacts of the Western Coal Company San Juan Underground Mine were assessed by determining ambient total suspended particulate (TSP) concentrations which would result from the mines emissions. Short-term, intermediate-term and long-term atmospheric dispersion models were applied to emissions from the mine site to determine TSP concentrations for 24-hour, 7-day, 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

Emissions from certain types of sources within the proposed mining complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon monoxide, nitrogen oxides and sulfur oxides) from on and off mine sources such as vehicles and generators would not be significant. In addition, emissions from blasting and fires were considered insignificant because of their intermittent nature. There is also considerable difficulty in quantifying these emissions. Although pollutant levels resulting from fires might be substantial, the potential for their occurrences is difficult to predict.

Table 4-2 presents federal and New Mexico ambient particulate standards, estimated background particulate levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual TSP levels resulting from total mine emissions. Maximum concentrations presented in this table are the highest TSP levels expected outside the mine boundary.

Examination of Table 4-2 shows that no state or federal ambient air quality standards should be violated beyond the assumed mine boundary of 2 km from the mine pit. Highest concentrations are predicted to occur within the mine boundary and concentrations reported in Table 4-2 are those predicted to occur at the boundary. The decrease of maximum 24-hour average TSP concentrations with distance is presented in Figure 4-1. Concentrations presented in this figure do not include the background contribution.

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively,

TABLE 4-2

AIR QUALITY IMPACT OF THE WESTERN COAL COMPANY SAN JUAN UNDERGROUND MINE

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1] Primary	Federal[1] Secondary	New Mexico[2]				
Annual	75	60	60	53	2.0	4	57
30-day	-	-	90	53	2.0	7	60
7-day	-	-	110	53	2.0	26	79
24-hour	260	150	150	53	2.0	48	101

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3]As measured from the mine pit.

[4]Including background.

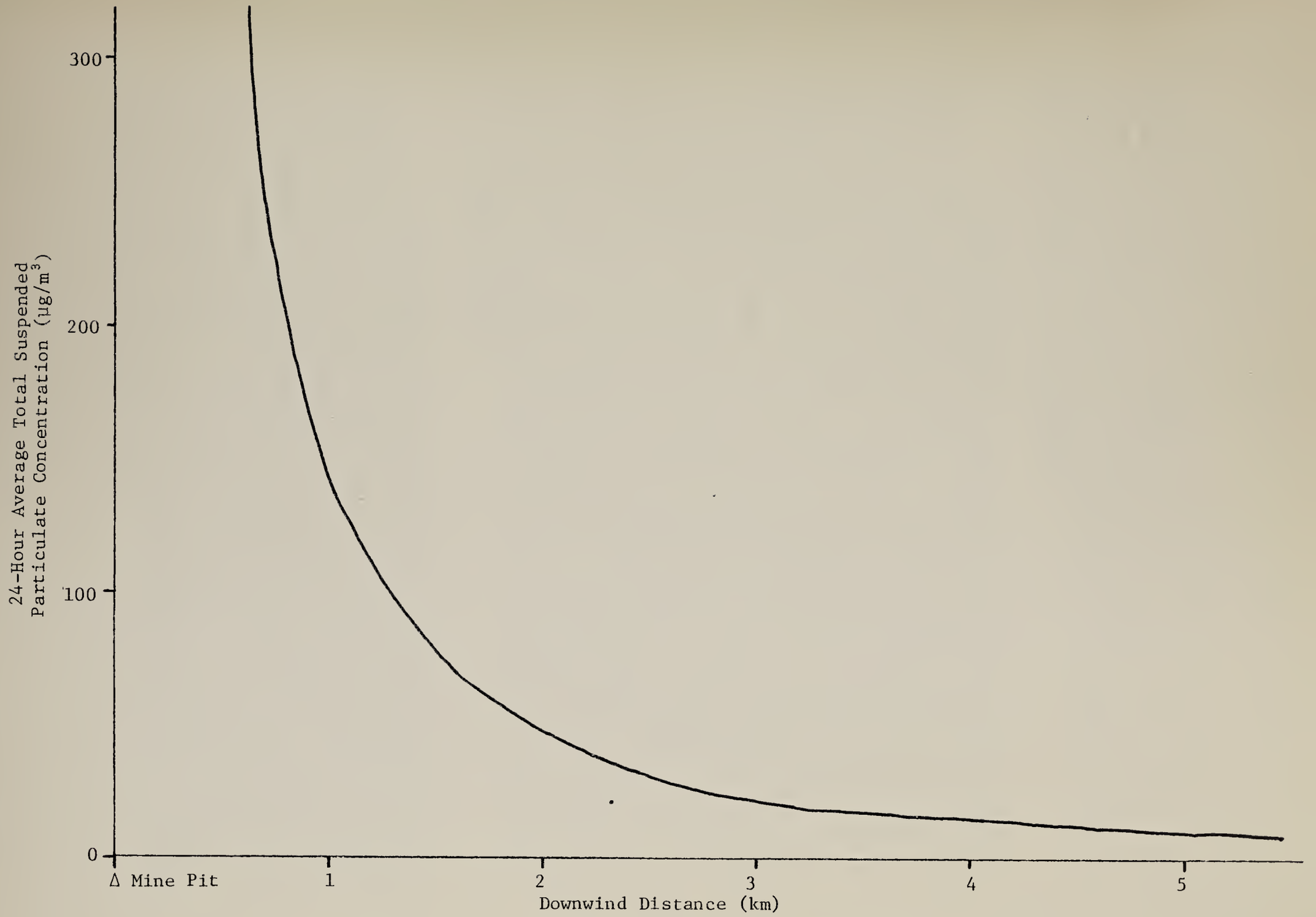

Figure 4-1. Maximum 24-hour Average Concentrations of Total Suspended Particulates Downwind from the Extension of the San Juan Mine by Western Coal Company

in Class II areas (the entire United States is currently designated Class II). Modeling results show that these levels would be exceeded out to downwind distances from the mine boundary of 0.6 km for the 24-hour case. The annual level of 10 $\mu g/m^3$ would not be exceeded.

Meteorological conditions associated with highest 24-hour and 7-day TSP levels are those which cause the greatest amount of wind-generated dust. These conditions typically include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollutant meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during these conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data from Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 - 2 times per year.

Increased TSP concentrations resulting from particulate emissions from the Western Coal Company mining operation would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind through the dispersing plume. However, the general visibility reduction within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentrations, the normal regional visibility on an otherwise clear day would be about 40 km.

4.3 Mitigating Measures

4.3.1 Measures Required by Law or Regulation

The most significant degradation of air quality which would be caused by the San Juan Underground Mine would occur for the total suspended particulates (TSP). The control of particulate matter from coal burning equipment and from mining and preparation plants is specified by New Mexico Health and Social Services Board regulations numbers 401, 504, and 672. Controls for "fugitive" particulate emissions specified in Regulation 672 and applicable to the San Juan Mine include the installation of hoods, shields, or sprays on all crushers, conveyors, screens, cleaners, hoppers, and chutes, necessary to prevent particulate matter from becoming airborne.

The U.S. Department of Interior has also established regulations controlling the operation of coal mining (43 CFR, Subpart 3041.1:2(b)(2)(v)). These regulations require the applicant to describe in detail the strategies which he would apply for controlling emission of air pollutants. A major aspect of the regulation is the control of fugitive particulate emissions by revegetation. In the long-term, revegetation and land reclamation can be nearly 100 percent effective in controlling fugitive particulate emissions. The short-term control would rely on measures such as procedures for preventing fires which would be specified by the applicants. It is difficult, however, to estimate the efficiency of these controls.

The U.S. Department of Interior, USGS, has promulgated rules and regulations for controlling of emissions from coal mining (30 CFR 211). To comply with these regulations

and rules, an applicant must enumerate in detail the control measures that would be applied for blasting, fire prevention, and controlling wind erosion. To ensure the maintenance of ambient air quality standards, monitoring of air pollutant concentrations is also required.

In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives should control fugitive dust emissions.

4.3.2 Other Mitigating Measures

The major air quality impact is expected from fugitive dust emissions. Predicted levels of total suspended particulates (TSP) will exceed the 24-hour Significant Deterioration increments outside the mine.

Fugitive dust may be minimized by watering at transfer points, such as conveyor ends or loading stations. Dust collection systems may be installed over coal treatment sources such as crushers and sorters. Attention to cleanliness and accidental spill prevention would reduce fugitive dust emissions.

The most significant long-term mitigating measure for fugitive dust would be the immediate reclamation of the area disturbed for underground mining. Reclamation would include grading, seeding, vegetation planting, landscaping, and other mitigating alternatives.

Coal fires as a potential pollutant source can be largely prevented by careful design of spoil piles and other preventive action. Prompt and thorough fire-fighting in the case of accidental fire can prevent a major pollution problem.

A continuous air monitoring program can be employed to determine background concentrations to TSP and measure the success of abatement programs.

Non-methane hydrocarbon (NMHC) emissions are primarily the result of transportation sources and solid waste disposal. Open burning should be minimized and regular inspection and maintenance of light duty vehicles and their emission control devices would reduce NMHC and oxidant levels.

4.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emission of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the construction and operation of the mine and coal handling facilities would be controlled with dust suppression system and other procedures including land reclamation and revegetation, wetting of road surfaces, and special blasting techniques. Although the fugitive dust emissions would be stringently controlled at the mine, the violation of the suspended particulate standards for Class II areas will be unavoidable in the vicinity of the property boundaries of the mine.

A loss of visibility would occur near the site because of the emissions of very fine particulates to the atmosphere. The decrease in regional visibility due to the rise in fugitive emissions would not be significant.

4.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

The major source of degradation of the short-term air quality would be the emissions of fugitive dust from coal handling. Fugutive dust would be entrained into the atmosphere by wind erosion of the coal storage area and unreclaimed areas, and by the cleaning, processing, and loading of coal.

These fugitive emissions would reduce visibility. Because the residence time of the particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the areas disturbed for mining is not

equivalent to current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

4.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at the mine may cause small changes in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered.

5.0 TWO UNDERGROUND MINES OF THE SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT

5.1 Description of the Air Quality

No ambient air quality data exists for this site. The total suspended particulate (TSP) concentrations measured at Star Lake are assumed to be representative of the air quality at the Salt River Project site. The annual mean concentration of 27 $\mu g/m^3$ is less than half the federal secondary and state air quality standards. While the maximum 24-hour concentration observed at the Star Lake is 214 $\mu g/m^3$, the second highest 24-hour concentration is 67 $\mu g/m^3$, which is well below the federal secondary and state air quality standards.

The TSP background concentrations for the annual and 24-hour averages is assumed as 27 $\mu g/m^3$. The background concentrations for other pollutants for this site in the rural central sub-area of the Star Lake - Bisti ES region is discussed in Section 2.1.2 of Volume 2, the Regional Assessment of Air Quality. The visibility observed for the Salt River Project site is presented in Volume 3, the Discussions of Climatology of the Individual Proposed Actions.

5.2 Air Quality Impact of the Proposed Actions

5.2.1 Emissions

To predict the air quality impact of the proposed Salt River Project's Two Underground Mines, emissions from all facets of the proposed mining and support activities must be determined. These emissions can then be expressed as ambient air pollutant concentrations by mathematical modeling of emission rates, source geometry and meteorological conditions.

The only significant emissions from the two underground mines would be particulate matter generated by wind erosion from disturbed areas and by coal processing activities. Emissions of gaseous pollutants from fuel combustion sources (vehicles and generators) would be very small and would not increase background levels measurably. Emissions from blasting and from unexpected ignition of coal fires would not be considered significant. In addition, emissions from activities during the construction phase would not be significant because of their intermittent nature. These emissions would be much lower than those generated by the mine operation.

Particulate emissions would be generated during the life of the mine (1984-2024) by the following activities:

1. Coal Storage: loading, unloading, and wind erosion of coal storage pile.

2. Coal Preparation and Processing: crushing, grinding, sorting, screening, drying.

Emission estimates were not provided by Salt River Project but were calculated by methods discussed in Appendix A of the Regional Assessment. Total emissions calculated by these methods are presented in Table 5-1. The numbers presented in this table are total annual particulate emissions.

TABLE 5-1

SUSPENDED PARTICULATE EMISSIONS RESULTING FROM THE OPERATION OF THE TWO UNDERGROUND MINES-SALT RIVER PROJECT

Activity	Emission (Tons/Year)
Coal Processing	95
Coal Storage	464
Total	559

5.2.2 Resultant Air Quality

The potential air quality impacts of the Salt River Project Underground Mine Units 1 and 2 were assessed by determining ambient total suspended particulate (TSP) concentrations which would result from the mines emissions. Short-term, intermediate-term and long-term atmospheric dispersion models were applied to emissions from the mine site to determine TSP concentrations for 24-hour, 7-day, 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

Emissions from certain types of sources within the proposed mining complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon monoxide, nitrogen oxides and sulfur oxides) from on and off mine sources such as vehicles and generators would not be significant. In addition, emissions from blasting and fires would be insignificant because of their intermittent nature. Although pollutant levels resulting from fires might be substantial, there is difficulty in

quantifying these emissions and the potential for their occurrences is difficult to predict.

Table 5-2 presents federal and New Mexico ambient particulate standards, estimated background particulate levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual TSP levels resulting from total mine emissions. Maximum concentrations presented in this table are the highest TSP levels expected outside the mine boundary.

Examination of Table 5-2 shows no federal or state ambient air quality standards would be violated beyond the assumed mine boundary (1.2 km from the loading facility). The 24-hour concentrations presented in Table 5-2 apply to either mining unit 1 or unit 2. Highest concentrations are predicted to occur within the mine boundary and concentrations reported in Table 5-2 occur at the boundary. The decrease of maximum 24-hour average TSP concentrations with distance is presented in Figure 5-1. Concentrations presented in this figure do not include the background contribution.

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ or 10 $\mu g/m^3$, respectively, in Class II areas (the entire United States is currently designated Class II). Modeling results show that these levels would be exceeded out to downwind distances from the mind boundary of 1.5 km for the 24-hour case. The annual level of 10 $\mu g/m^3$ would not be exceeded.

Meteorological conditions associated with highest 24-hour and 7-day TSP levels are those which cause the greatest amount of wind-generated dust. These conditions typically

TABLE 5-2

AIR QUALITY IMPACT OF THE SALT RIVER PROJECT UNDERGROUND MINE UNITS 1 & 2

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1]		New Mexico[2]				
	Primary	Secondary					
Annual	75	60	60	27	1.2	5	32
30-day	-	-	90	27	1.2	9	36
7-day	-	-	110	27	1.2	60	87
24-hour	260	150	150	27	1.2	110	137

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3]As measured from the loading facility of unit 1 or unit 2.

[4]Including background.

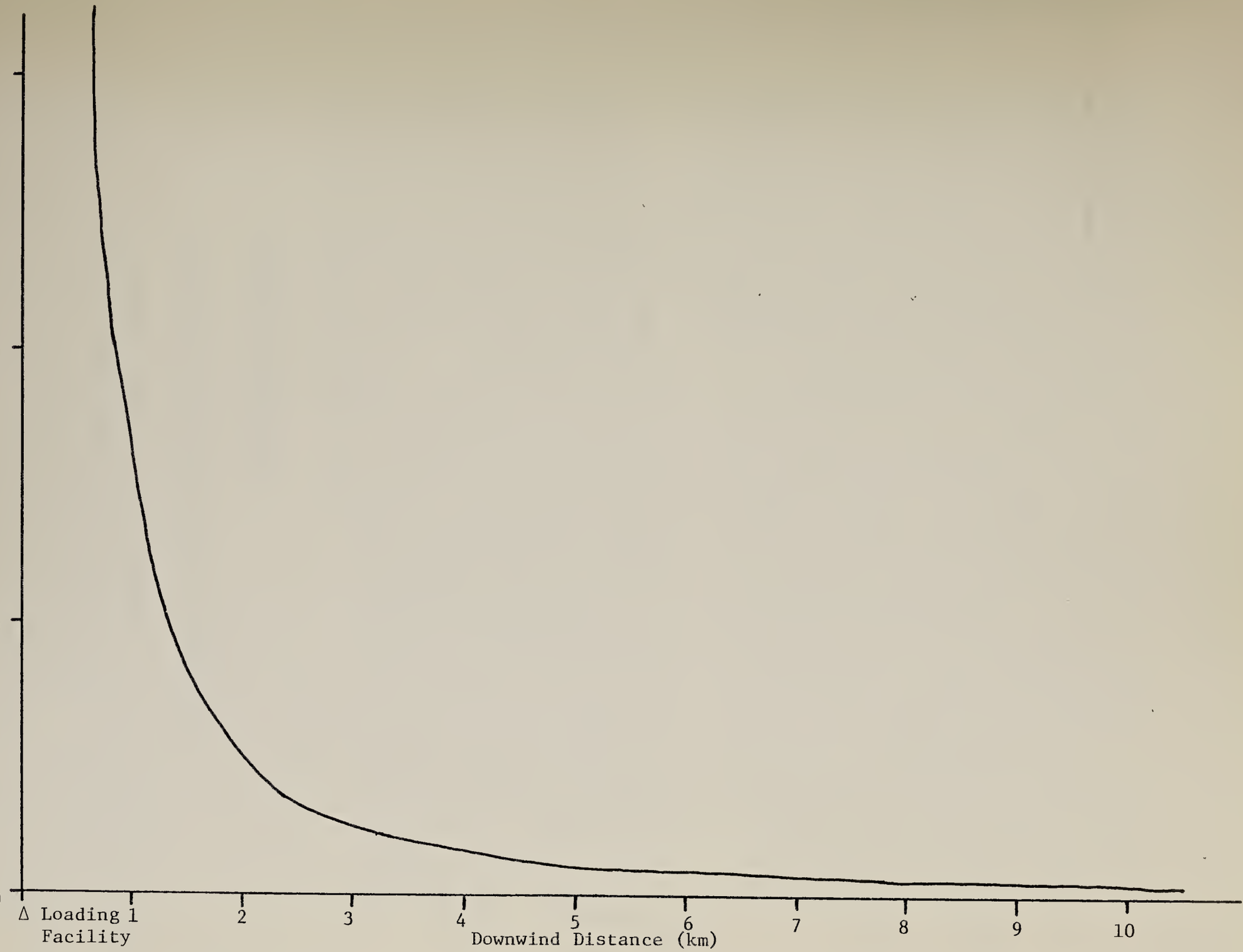

Figure 5-1. Maximum 24-hour Average Concentrations of Total Suspended Particulates Downwind from the Two Underground Mines of the Salt River Project

include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollutant meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during those conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data for Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 - 2 times a year.

Increased TSP concentrations resulting from particulate emissions from the Salt River Project mining operations would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind through the dispersing plume. However, the general visibility reduction within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentrations, the normal regional visibility on an otherwise clear day would be about 48 km.

5.3 Mitigating Measures

5.3.1 Measures Required by Law or Regulation

The most significant degradation of air quality which would be caused by the Salt River Project Underground Mines would occur for total suspended particulates (TSP). The control of particulate matter from coal burning equipment and from mining and preparation plants is specified by New Mexico Health and

Social Services Board regulations numbers 401, 504, and 672. Controls for "fugitive" particulate emissions specified in Regulation 672 and applicable to the Salt River Project underground mines include the installation of hoods, shields, or sprays on all crushers, conveyors, screens, cleaners, hoppers, and chutes, necessary to prevent particulate matter from becoming airborne.

The U.S. Department of Interior, has also established regulations controlling the operation of coal mining (43 CFR, Subpart 3041.1:2(b)(2)(v)). These regulations require the applicant to describe in detail the strategies which he would apply for controlling emission of air pollutants. Major aspects of the regulation is the control of fugitive particulate emissions by revegetation. In the long-term, revegetation and land reclamation can be nearly 100 percent effective in controlling fugitive particulate emissions. The short-term control would rely on measures and procedures for preventing fires which will be specified by the applicants. It is difficult, however, to estimate the efficiency of these controls.

The U.S. Department of Interior, USGS, has promulgated rules and regulations for controlling of emissions from coal mining (30 CFR 211). To comply with these regulations and rules, an applicant must enumerate in detail the control measures that would be applied for blasting, fire prevention, and controlling

wind erosion. To ensure the maintenance of ambient air quality standards, monitoring of air pollutant concentrations is also required.

In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives should control fugitive dust emissions.

5.3.2 Other Mitigating Measures

The major air quality impact is expected from fugitive dust emissions. Predicted levels of total suspended particulates (TSP) would not exceed state and national standards, but the 24-hour significant deterioration increments for particulates would be violated at 1.5 km beyond the boundary of the mine.

Fugitive dust may be minimized by watering at transfer points, such as conveyor ends or loading stations. Dust collection systems may be installed over coal treatment sources such as crushers and sorters. Attention to cleanliness and accidental spill prevention would reduce fugitive dust emissions.

The most significant long-term mitigating measure for fugitive dust would be the immediate reclamation of the area disturbed for mining. Reclamation would include grading, seeding, vegetation planting, landscaping, and other mitigating alternatives.

Coal fires as a potential pollutant source can be largely prevented by careful design of spoils piles and other preventive action. Prompt and thorough fire-fighting in the case of accidental fire can prevent a major pollution problem.

A continuous air monitoring program can be employed to determine background concentrations of TSP and measure the success of abatement programs.

Non-methane hydrocarbon (HMHC) emissions are primarily the result of transportation sources and solid waste disposal. Open burning should be minimized and regular inspection and maintenance of light duty vehicles and their emission control devices would reduce NMHC and oxidant levels. Hydrocarbon (HC) control devices should be considered for the heavy dutry, off-the-road vehicles.

5.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emission of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the operation of Salt River Project mines and coal handling facilities would be controlled with dust suppression systems and other procedures including land reclamation and revegetation of disturbed areas, wetting of road surfaces, and special blasting techniques. Although the fugitive dust emissions would be stringently controlled at the mines, the violation of the 24-hour suspended particulate standards of Class II areas would be unavoidable in the vicinity of the property boundaries of the mines.

A loss of visibility would occur for this site because of the emissions of fine particulates to the atmosphere. The decrease in regional visibility due to the rise in fugitive emissions would not be significant.

5.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

The major source of degradation of the short-term air quality would be the emissions of fugitive dust from coal handling. Fugitive dust would be entrained into the atmosphere by wind erosion of the coal storage area and unreclaimed areas, and by the cleaning, processing, and loading of coal.

The fugitive emissions would reduce visibility. Because the residence time of the particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the areas disturbed by underground mining is not equivalent to the current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

5.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at mines may cause a small change in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered.

6.0 THE SALAZAR SURFACE COAL MINE OF THE FREEMAN-UNITED COAL MINING COMPANY

6.1 Description of the Air Quality

The closest ambient air quality monitor to the Freeman-United Coal Mining Company's Salazar Mine is near Star Lake. Only total suspended particulates were monitored. The annual geometric mean (August 1975-July 1976) of 27 $\mu g/m^3$ is assumed as the background concentration for the mine site. The secondary 24-hour standard level for TSP was exceeded once at Star Lake in 1976. Otherwise, the levels are well below national standards.

The background concentrations for the other pollutants are well below standards and are discussed in Section 2.1.2 of Volume 2, the Regional Assessment of Air Quality. The visibility observed for the Salazar Mine is presented in Volume 3, the Discussions of Climatology of the Individual Proposed Actions.

6.2 Air Quality Impact of the Proposed Actions

6.2.1 Emissions

To predict the air quality impact of the proposed Freeman-United Coal Mining Company's Salazar Surface Mine, emissions from all facets of the proposed mining and support activities must be determined. These emissions can then be expressed as ambient air pollutant concentrations by mathematical modeling of emission rates, source geometry and meteorological conditions.

The only significant emissions from the Salazar Mine would be particulate matter generated by wind erosion and by mining activities. Emissions of gaseous pollutants from fuel combustion sources (vehicles and generators) would be very small and would not increase background levels measurably. Emissions from blasting and from unexpected ignition of coal fires would be insignificant. In addition, emissions from activities during the construction phase would be insignificant because of their intermittent nature. These emissions would be much lower than those generated by the mine operation.

Particulate emissions would be generated during the life of the mine (1985-2005) by the following activities:

1. Mining: including wind erosion and vehicular-generated dust associated with development of the mining pit, overburden piles, and other unvegetated land erosion.

2. Haul Road Dust.

3. Coal Storage: loading, unloading, and wind erosion of the coal storage pile.

4. Coal Preparation and Processing: crushing, grinding, sorting, screening, drying.

Emission estimates were not provided by Freeman-United Coal Mining Company but were calculated by methods discussed in Appendix A of the Regional Assessment. Total emissions calculated by these methods are presented in Table 6-1. The numbers presented in this table are total annual particulate emissions.

TABLE 6-1

SUSPENDED PARTICULATE EMISSIONS RESULTING FROM THE OPERATION OF THE SALAZAR MINE, FREEMAN-UNITED COAL MINING COMPANY

Activity	Emission (Tons/Year)
Coal Processing	36
Coal Storage	285
Mining	4,479
Haul Road Dust	18
Total	4,818

6.2.2 Resultant Air Quality

The potential air quality impacts of the Freeman-United Coal Mining Company's Salazar Mine were assessed by determining ambient total suspended particulate (TSP) concentrations which would result from the mine emissions. Short-term, intermediate-term and long-term atmospheric dispersion models were applied to emissions from the mine site to determine TSP concentrations for 24-hour, 7-day, and 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

Emissions from certain types of sources within the proposed mining complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon monoxide, nitrogen oxides and sulfur oxides) from on and off mine sources such as vehicles and generators would not be significant and would not increase background levels measurably. In addition, emissions from blasting and fires would be insignificant because of their

intermittent nature. Although pollutant levels resulting from fires might be substantial, there is difficulty in quantifying these emissions and the potential for their occurrences is difficult to predict.

Table 6-2 presents federal and New Mexico ambient particulate standards, estimated background particulate levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual TSP levels resulting from total mine emissions. Maximum concentrations presented in this table are the highest TSP levels expected outside the mine boundary.

Examination of Table 6-2 shows that the federal secondary standards (annual average and 24-hour) and the New Mexico standards would be violated. Maximum concentrations are predicted to occur within the mine boundary and concentrations reported in Table 6-2 are those predicted to occur at the boundary. Maximum concentrations for all averaging times decrease rapidly with distance and concentrations would drop below levels specified in federal and New Mexico standards beyond 1.7 km from the mine boundary. Figure 6-1 presents the decrease in maximum 24-hour TSP concentrations with downwind distance. Concentrations presented in this figure do not include the background contribution.

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively, in Class II areas (the entire United States is currently designated Class II). Modeling results show that these levels would be exceeded out to downwind distances from the coal preparation facility of 2.4 km for the annual case and 10.7 km for the 24-hour case.

TABLE 6-2

AIR QUALITY IMPACT OF THE FREEMAN UNITED COAL COMPANY'S SALAZAR MINE

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1]		New Mexico[2]				
	Primary	Secondary					
Annual	75	60	60	27	0.3	65	97
30-day	-	-	90	27	0.3	114	141
7-day	-	-	110	27	1.6	138	165
24-hour	260	150	150	27	1.6	250	277

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3]As measured from the loading facility.

[4]Including background.

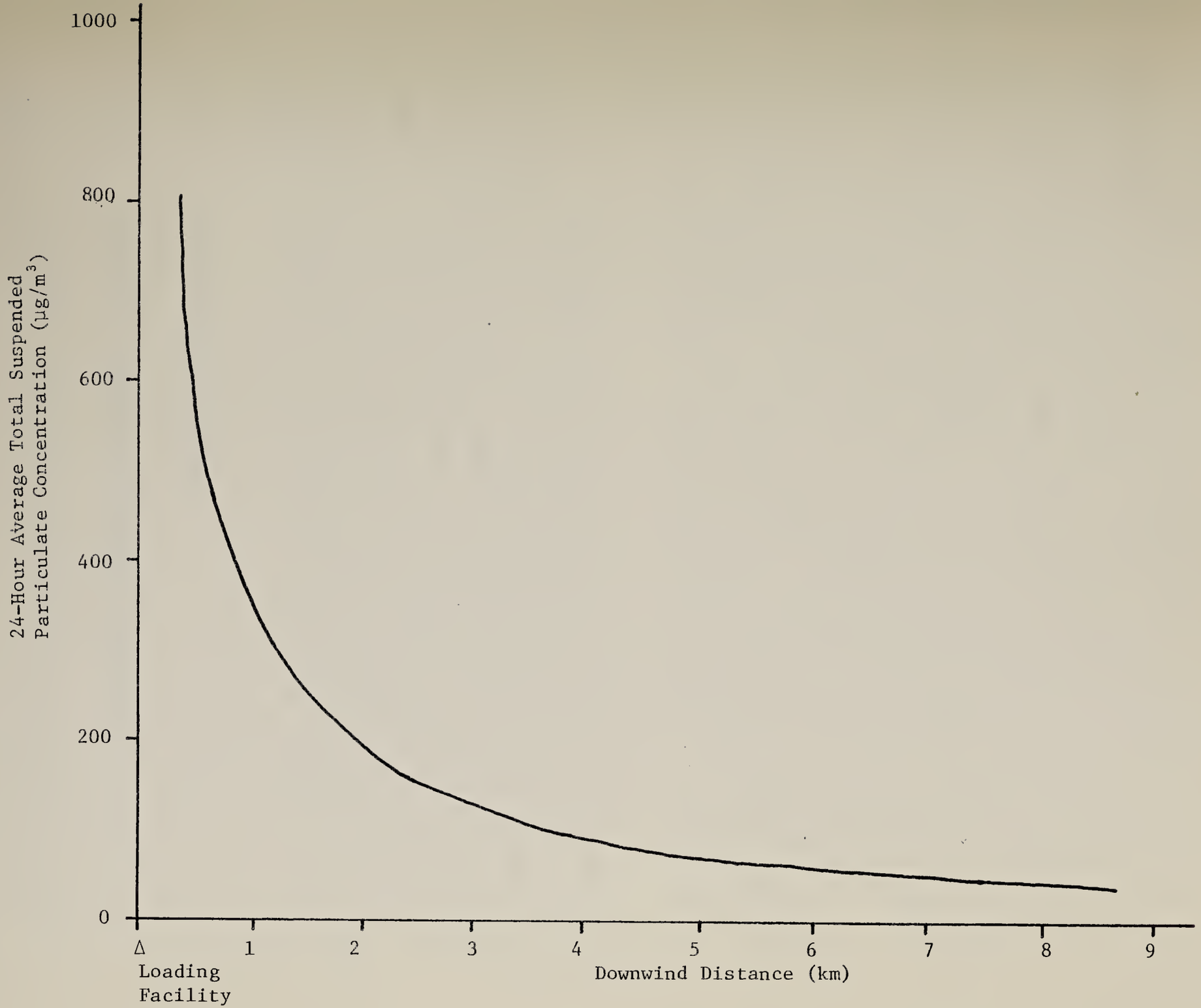

Figure 6-1. Maximum 24-hour Average Concentrations of Total Suspended Particulates Downwind from the Salazar Surface Mine of the Freeman-United Coal Mining Company.

Meteorological conditions associated with highest 24-hour and 7-day TSP levels are those which cause the greatest amount of wind-generated dust. These conditions typically include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollutant meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during these conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data for Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 - 2 times per year.

Increased TSP concentrations resulting from particulate emissions from the Salazar mining operation would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind through the dispersing plume. However, the general visibility reduction within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentrations, the normal regional visibility on an otherwise clear day would be about 48 km.

6.3 Mitigating Measures

6.3.1 Measures Required by Law or Regulation

The most significant degradation of air quality which would be caused by the proposed Salazar mine would occur for

total suspended particulates (TSP). The control of particulate matter from coal burning equipment and from mining and preparation plants is specified by New Mexico Health and Social Services Board regulations numbers 401, 504, and 672. Some of the controls for "fugitive" particulate emissions from coal mining and preparation plants specified in Regulation 672 include:

1. The installation of hoods, shields, or sprays on all crushers, conveyors, screens, cleaners, hoppers, and chutes, necessary to prevent particulate matter from becoming airborne.

2. The spraying or other treatment of main coal hauling roads.

The U.S. Department of Interior has also established regulations controlling the operation of coal mining (43 CFR, Subpart 3041.1:2(b)(2)(v)). These regulations require the applicant to describe in detail the strategies which he would apply for controlling emission of air pollutants. Major aspects of the regulation is the control of fugitive particulate emissions by revegetation. In the long-term, revegetation and land reclamation can be nearly 100 percent effective in controlling fugitive particulate emissions. The short-term control would rely on measures such as size and timing of blasting and procedures for preventing fires which will be specified by the applicants. It is difficult, however, to estimate the efficiency of these controls.

The U.S. Department of Interior, USGS, has promulgated rules and regulations for controlling of emissions from coal

mining (30 CFR 211). To comply with these regulations and rules, an applicant must enumerate in detail the control measures that would be applied for blasting, fire prevention, and controlling wind erosion. To ensure the maintenance of ambient air quality standards, monitoring of air pollutant concentrations is also required.

The fugitive dust emissions from construction are required to be controlled in the short-term by washing, wetting, or otherwise treating or covering vehicles, road, and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading. In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives should control fugitive dust emissions.

In addition, the New Mexico State Bureau of Mines and Mineral Resources has established the "Regulations of the Coal Surfacemining Commission Pursuant to New Mexico Coal Surfacemining Act" Chapter 68, Laws 1972, dated January 3, 1973. These regulations require that the disturbed areas be revegetated.

6.3.2 Other Mitigating Measures

The major air quality impact is expected from fugitive dust emissions from surface mining. The Class II Significant Deterioration increments and federal secondary and New Mexico Standards would be exceeded outside the boundary of the mine.

Fugitive dust may be minimized by watering at transfer points, such as conveyor ends or loading stations. Dust collection systems may be installed over coal treatment sources such as crushers and sorters. Attention to cleanliness and accidental spill prevention would reduce fugitive dust emissions.

The most significant long-term mitigating measure for fugitive dust would be the immediate reclamation of mined surfaces. As mining proceeds, previously mined areas would not continue to be a source of emissions. Reclamation would include grading, seeding, vegetation planting, landscaping, and other mitigating alternatives.

Blasting operations unavoidably force particulates into the atmosphere but the detrimental effects can be minimized by careful blast design to reduce the amount of very small particles emitted. This can be accomplished by proper sequencing and limiting the amount of explosive. Coal fires as a potential pollutant source can be largely prevented by careful design of overburden piles and other preventive action. Prompt and thorough fire fighting in the case of accidental fire can prevent a major pollution problem.

A continuous air monitoring program can be employed to determine background concentrations of TSP and measure the success of abatement programs.

Particulate levels associated with vehicular traffic can be minimized by attention to cleanliness of vehicles, wetting down areas of potential fugitive emissions, and by restricting unauthorized use of access roads.

Non-methane hydrocarbon (NMHC) emissions are primarily the result of transportation sources and solid waste disposal. Open burning should be minimized and regular inspection and maintenance of light duty vehicles and their emission control devices should be considered for the off-the-road vehicles.

6.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emissions of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the construction and operation of the surface mine and coal handling facilities would be controlled with dust suppression system and other procedures including land reclamation and re-vegetation, wetting of road surfaces, and special blasting techniques. Fugitive dust emissions from off-road vehicles would be unavoidable although they will be rigorously controlled by watering. Even though the fugitive dust emissions would be stringently controlled at the surface mines, the violation of the suspended particulate standards of Class II areas would be unavoidable in the vicinity of the property boundaries of the mines.

A loss of visibility would occur at the site because of the emission of very fine particulates into the atmosphere. The decrease in regional visibility due to the rise in fugitive emissions would not be significant.

6.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

The major source of degradation of the short-term air quality would be the emissions of fugitive dust from coal mining, transporting, and handling. Fugitive dust would be entrained into the atmosphere by wind erosion of the coal and spoil storage area, and unreclaimed areas, by off-road vehicles, by transport of the coal, and by the cleaning, processing, and loading of coal.

These fugitive emissions would reduce visibility. Because the residence time of the particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the surface mine is not equivalent to the current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

6.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at mines may cause small changes in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered.

7.0 THE BISTI COAL PROJECT OF THE ARCH MINERAL COMPANY

7.1 Description of the Air Quality

No ambient air quality data exists for this site. The total suspended particulate (TSP) concentrations measured at Star Lake are assumed to be representative of the air quality at the Arch Mineral Mine site. The annual mean concentration of 27 $\mu g/m^3$ is less than half the federal secondary and state air quality standards. While the maximum 24-hour concentration observed at Star Lake is 214 $\mu g/m^3$, the second highest 24-hour concentration is 67 $\mu g/m^3$, which is well below the federal secondary and state air quality standards.

The TSP background concentrations for the annual and 24-hour averages is assumed at 27 $\mu g/m^3$. The background concentrations for other pollutants for this site in the rural central sub-area of the Star Lake - Bisti ES region is discussed in Section 2.1.2 of Volume 2, the Regional Assessment of Air Quality. The visibility observed for the Arch Mineral Site is presented in Volume 3, the Discussions of Climatology of the Individual Proposed Actions.

7.2 Air Quality Impact of the Proposed Actions

7.2.1 Emissions

To predict the air quality impact of the proposed Arch Mineral's Arkland Company Surface Mines, emissions from all facets of the proposed mining and support activities must be determined. These emissions can then be expressed as ambient air pollutant concentrations by mathematical modeling of emission rates, source geometry, and meteorological conditions.

The only significant emissions from the mines would be particulate matter generated by wind erosion and by mining activities. Emissions of gaseous pollutants from fuel combustion sources (vehicles and generators) would be very small and have no significant impact. Emissions from blasting and from unexpected ignition of coal fires would not be considered significant. In addition, emissions from activities during the construction phase would not be significant because of their intermittent nature. These emissions would be much lower than those generated by the mine operation.

Particulate emissions would be generated during the life of the mine (1980-2012) by the following activities:

1. Mining: including vehicular-generated dust and wind erosion of the mining pit, overburden piles, and other unvegetated land.

2. Haul Road Dust.

3. Coal Storage: loading, unloading, and wind erosion of coal storage pile.

4. Coal Preparation and Processing: crushing, grinding, sorting, screening, drying.

Emission estimates were not provided by Arch Mineral Corporation but were calculated by methods discussed in Appendix A of the Regional Assessment. Total emissions calculated by these methods are presented in Table 7-1. The numbers presented in this table are total annual particulate emissions.

TABLE 7-1

SUSPENDED PARTICULATE EMISSIONS RESULTING FROM THE OPERATION OF THE ARKLAND COMPANY SURFACE MINES, ARCH MINERAL

Activity	Emission (Tons/Year)
Coal Processing	364
Coal Storage	570
Mining	8958
Haul Road Dust	72
Total	9964

7.2.2 Resultant Air Quality

The potential air quality impacts of the Arch Mineral Company Surface Mining Units 1 and 2 were assessed by determining ambient total suspended particulate (TSP) concentrations which would result from the mines emissions. Short-term, intermediate-term and long-term atmospheric dispersion models were applied to emissions from the mine site to determine TSP concentrations for 24-hour, 7-day, 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

Emissions from certain types of sources within the proposed mining complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon monoxide, nitrogen oxides, and sulfur oxides) from intermittent mine sources such as vehicles and generators would not be significant. In addition, emissions from blasting and fires

would be insignificant because of their intermittent nature. Although pollutant levels resulting from fires might be substantial, there is difficulty in quantifying these emissions and the potential for their occurrences is difficult to predict.

Tables 7-2 and 7-3 present federal and New Mexico ambient particulate standards, estimated background particulate levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual TSP levels resulting from total emissions from mining units 1 and 2. Maximum concentrations presented in these tables are the highest TSP levels expected outside the mine boundaries. Because of the large distance separating the two mines, no significant interaction occurs.

Examination of Tables 7-2 and 7-3 shows that all state and federal ambient air quality standards would be violated in the vicinity of mining unit 2. However, emissions from mining unit 1 would not result in any violations outside the plant boundary. Maximum concentrations are predicted to occur within the mine boundary and concentrations reported in Tables 7-2 and 7-3 occur at the boundary. Maximum concentrations would drop below levels specified in federal and New Mexico standards beyond 1.4 km from mining unit 2.

Figures 7-1 and 7-2 depict the decrease in maximum 24-hour TSP concentrations with distance for mining units 1 and 2. Concentrations presented in these figures do not include the background contributions.

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively, in Class II areas (the entire United States is currently designated Class II). Modeling results show that these levels would

TABLE 7-2

AIR QUALITY IMPACT OF THE ARCH MINERAL COMPANY SURFACE MINING UNIT 1

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1]		New Mexico[2]				
	Primary	Secondary					
Annual	75	60	60	27	1.2	13	40
30-day	-	-	90	27	1.2	23	50
7-day	-	-	110	27	4.6	28	55
24-hour	260	150	150	27	4.6	50	77

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3]As measured from the loading facility.

[4]Including background.

TABLE 7-3

AIR QUALITY IMPACT OF THE ARCH MINERAL COMPANY SURFACE MINING UNIT 2

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1] Primary	Federal[1] Secondary	New Mexico[2]				
Annual	75	60	60	27	0.5	60	87
30-day	-	-	90	27	0.5	105	132
7-day	-	-	110	27	6.1	130	157
24-hour	260	150	150	27	6.1	236	263

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3]As measured from the loading facility.

[4]Including background.

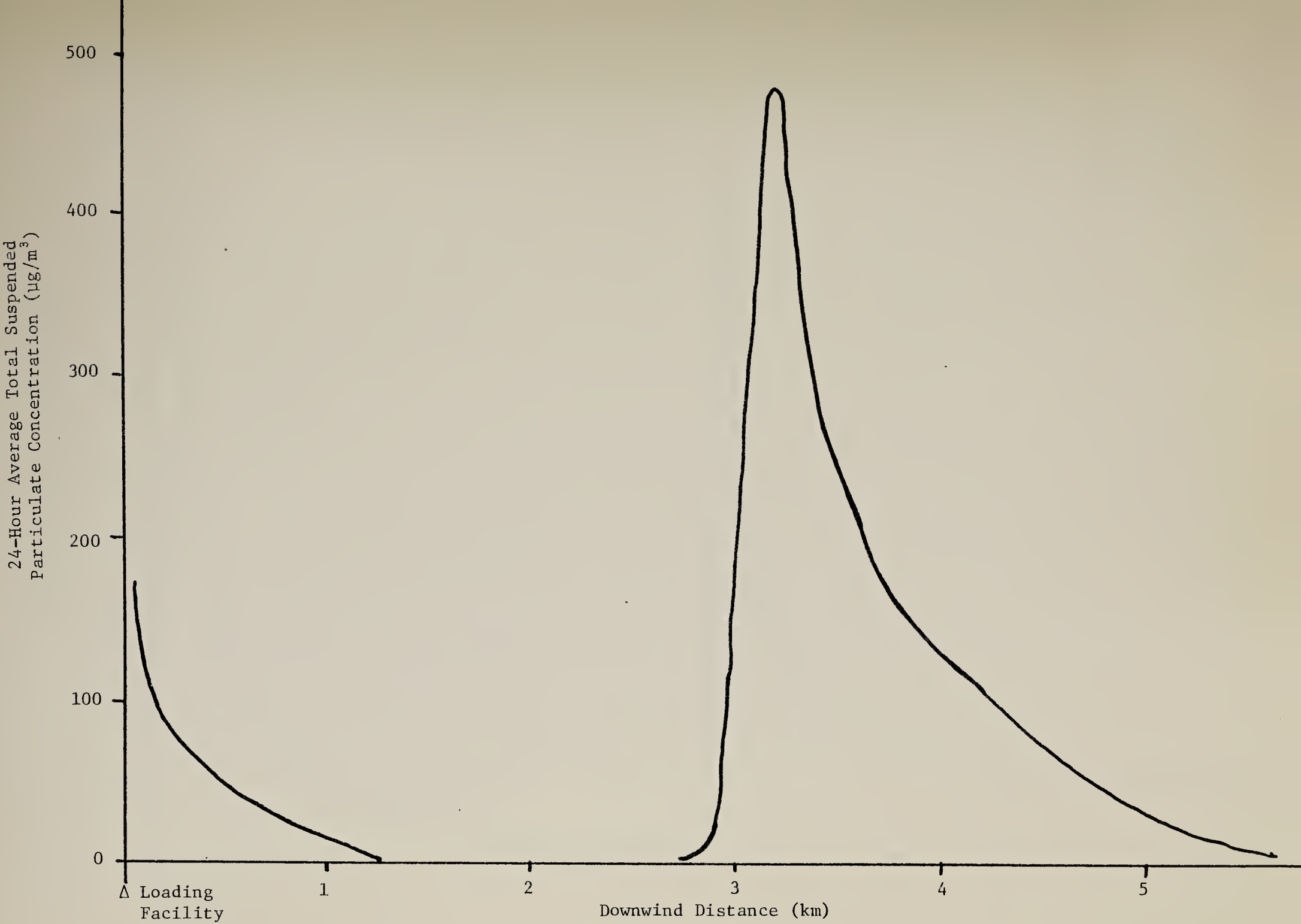

Figure 7-1. Maximum 24-hour Average Concentration of Total Suspended Particulates from the Arch Mineral Company Surface Mining Unit #1.

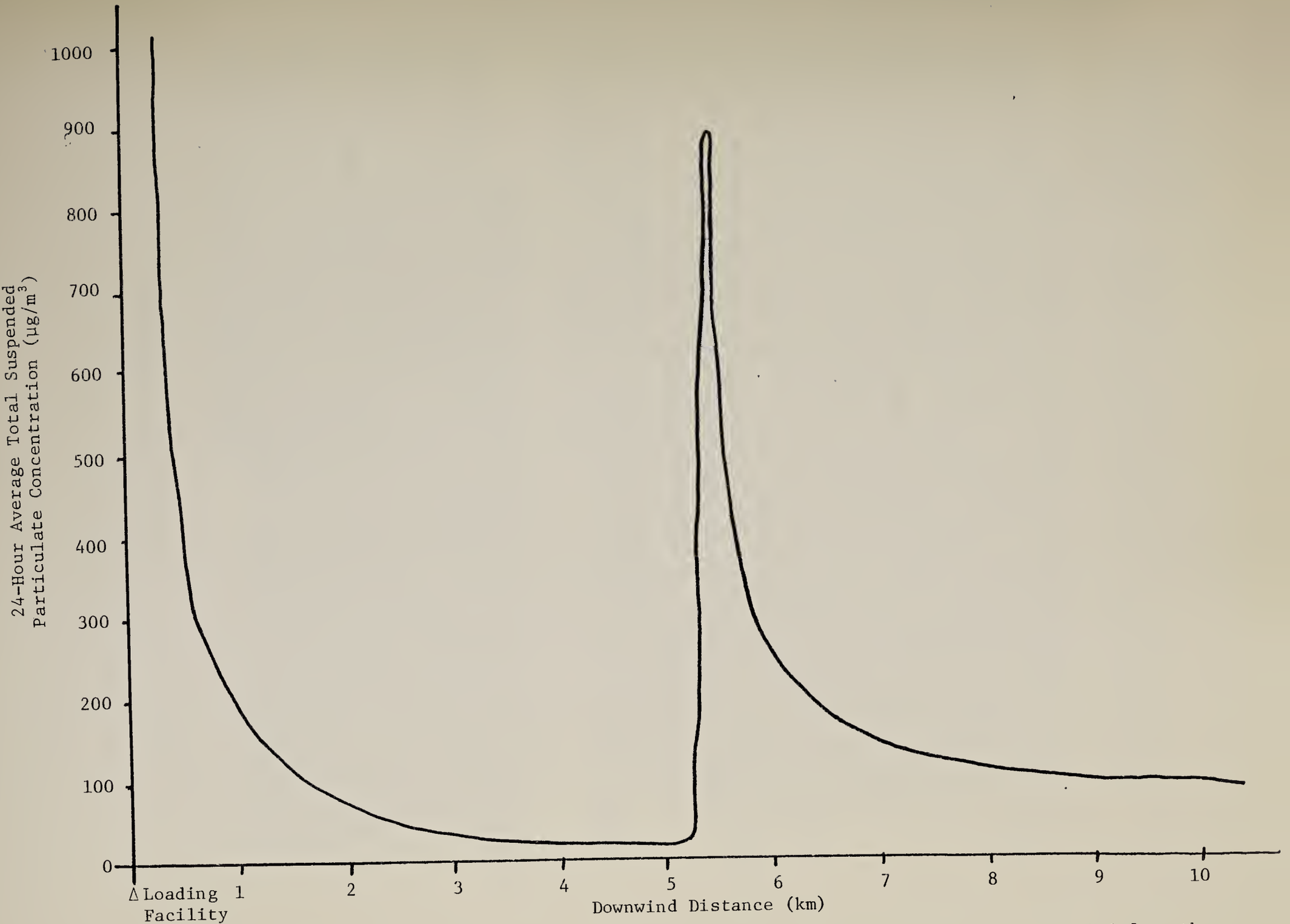

Figure 7-2. Maximum 24-hour Average Concentrations of Total Suspended Particulates Downwind from the Arch Mineral Company Surface Mining Unit #2.

exceeded out to downwind distances from the mine boundary of 1.3 km for the annual case and 12 km for the 24-hour case.

Meteorological conditions associated with highest 24-hour and 7-day TSP levels are those which cause the greatest amount of wind-generated dust. These conditions typically include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollutant meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during those conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data for Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 - 2 times per year.

Increased TSP concentrations resulting from particulate emissions from the Arch Mineral Corporation mining operations would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind through the dispersing plume. However, the general visibility reduction within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentrations, the normal regional visibility on an otherwise clear day would be about 48 km.

7.3 Mitigating Measures

7.3.1 Measures Required by Law or Regulation

The most significant degradation of air quality which would be caused by the proposed surface mines would occur for total suspended particulates (TSP). The control of particulate matter from coal burning equipment and from mining and preparation plants is specified by New Mexico Health and Social Services Board regulations numbers 401, 504, and 672. Some of the controls for "fugitive" particulate emissions from coal mining and preparation plants specified in Regulation 672 include:

1. The installation of hoods, shields, or sprays on all crushers, conveyors, screens, cleaners, hoppers, and chutes, necessary to prevent particulate matter from becoming airborne.

2. The spraying or other treatment of main coal hauling roads.

The U.S. Department of Interior has also established regulations controlling the operation of coal mining (43 CFR, Subpart 3041.1:2(b)(2)(v)). These regulations require the applicant to describe in detail the strategies which he will apply for controlling emission of air pollutants. Major aspects of the regulation is the control of fugitive particulate emissions by revegetation. In the long-term, revegetation and land reclamation can be nearly 100 percent effective in controlling fugitive particulate emissions. The short-term control would rely on measures such as size and timing of blasting and procedures for preventing fires which will be specified by the applicants. It is difficult, however, to estimate the efficiency of these controls.

The U.S. Department of Interior, USGS, has promulgated rules and regulations for controlling of emissions from coal mining (30 CFR 211). To comply with these regulations and rules, an applicant must enumerate in detail the control measures that would be applied for blasting, fire prevention, and controlling wind erosion. To ensure the maintenance of ambient air quality standards, monitoring of air pollutant concentrations is also required. The fugitive dust emissions from construction are required to be controlled in the short-term by washing, wetting down, or otherwise treating or covering vehicles, road, and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading. In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives should control fugitive dust emissions.

In addition, the New Mexico State Bureau of Mines and Mineral Resources has established the "Regulations of the Coal Surfacemining Commission Pursuant to New Mexico Coal Surfacemining Act" Chapter 68, Laws 1972, dated January 3, 1973. These regulations require that the disturbed areas be revegetated.

7.3.2 Other Mitigating Measures

The major air quality impact is expected from fugitive dust emissions from surface mining. Predicted levels of total suspended particulates (TSP) from mine unit 2 will exceed state 24-hour and 7-day standards and the national 24-hour standards. Both mines will cause significant deterioration increments for TSP to be exceeded outside the mine boundaries.

The most significant long-term mitigating measure for fugitive dust is the immediate reclamation of mined surfaces. As mining proceeds, previously mined areas would not continue to

be a source of emissions. Reclamation would include grading, seeding, vegetation planting, landscaping, and other mitigating alternatives.

Blasting operations unavoidably force particulates into the atmosphere but the deterimental effects can be minimized by careful blast design to reduce the amount of very small particles emitted. This can be accomplished by proper sequencing and limiting the amounts of explosive. Coal fires as a potential pollutant source can be largely prevented by careful design of overburden piles and other preventive action. Prompt and thorough fire fighting in the case of accidental fire can prevent a major pollution problem.

A continuous air monitoring program can be employed to determine background concentrations of TSP and measure the success of abatement programs.

Particulate levels associated with vehicular traffic can be minimized by attention to cleanliness of vehicles, wetting down areas of potential fugitive emissions, and by restricting unauthorized use of access roads.

Non-methane hydrocarbon (NMHC) emissions are primarily the result of transportation sources and solid waste disposal. Open burning should be minimized and regular inspection and maintenance of light-duty vehicles and their emission control devices would reduce NMHC and oxidant levels. Hydrocarbon (HC) control devices should be considered for the off-the-road vehicles.

7.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emission of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the construction and operation of surface mines, and coal handling facilities, would be controlled with dust suppression systems and other procedures including land reclamation and revegetation, wetting of road surfaces, and special blasting techniques. Fugutive dust emissions from off-road vehicles would be unavoidable although they will be rigorously controlled by watering. Even though the fugitive dust emissions would be stringently controlled at the mines, the violation of the federal and New Mexico suspended particulate standards would be unavoidable in the vicinity of the property boundaries of the mines. The exhaust emissions from diesel locomotives would be minimal, but unavoidable.

The loss of visibility resulting from very fine particulate emissions would occur near the mines. The decrease in regional visibility due to the rise in fugitive emissions would not be significant.

7.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

The major source of degradation of the short-term air quality would be the emissions of fugitive dust from coal mining, transporting, and handling. Fugitive dust would be entrained into the atmosphere by wind erosion of the coal and spoil storage area, and unreclaimed areas, by off-road vehicles, by transport of the coal, and cleaning, processing and loading of coal.

These fugitive emissions would reduce visibility. Because the residence time of the particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the surface mines is not equivalent to the current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

7.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at mines may cause a small change in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered.

8.0 THE STAR LAKE SURFACE MINES OF PEABODY COAL AND CHACO ENERGY

8.1 Description of the Air Quality

The closest ambient air quality monitor to the proposed Surface Mines is near Star Lake. Only total suspended particulates have been monitored. The annual geometric mean (August 1975-July 1976) of 27 $\mu g/m^3$ is assumed as the background concentration for the mine sites. The federal secondary 24-hour standard was exceeded. Otherwise the levels were well below national standards. The background concentrations of the other pollutants are well below standards and are discussed in detail in Section 2.1.2 of Volume 2, Regional Assessment of Air Quality. The visibility observed for Star Lake mine sites is presented in Volume 3, the Discussions of Climatology of the Individual Proposed Actions.

8.2 Air Quality Impact of the Proposed Actions

8.2.1 Emissions

To predict the air quality impact of the proposed Star Lake Surface Mines, emissions from all facets of the proposed mining and support activities must be determined. These emissions can then be expressed as ambient air pollutant concentrations by mathematical modeling of emission rates, source geometry and meteorological conditions.

The only significant emissions from the Star Lake Mines would be particulate matter generated by wind erosion and by mining activities. Emissions of gaseous pollutants from fuel combustion sources (vehicles and generators) would be very small and have no significant impact. Emissions from blasting and from unexpected ignition of coal fires would not be significant.

In addition, emissions from activities during the construction phase would be insignificant because of their intermittent nature. These emissions would be much lower than those generated by the mine operations.

Particulate emissions would be generated during the life of the mines (1980-2020) by the following activities:

1. Mining: including vehicular-generated dust and wind erosion of the mining pit, overburden piles, and other unvegetated land.

2. Haul Road Dust.

3. Coal Storage: loading, unloading, and wind erosion of coal storage pile.

4. Coal Preparation and Processing: crushing, grinding, sorting, screening, drying.

Emission estimates were not provided by Peabody Coal Company but were calculated by methods discussed in Appendix A of the Regional Assessment. Total emissions calculated by these methods are presented in Table 8-1. The numbers presented in this table are total annual particulate emissions.

8.2.2 Resultant Air Quality

The potential air quality impacts of the Peabody Coal Company and Chaco Energy Star Lake Surface Mines were addressed by determining ambient total suspended particulate (TSP) concentrations which would result from the mines' emissions. Short-term, intermediate-term, and long-term atmospheric dispersion models were applied to emissions from the mine sites to determine

TABLE 8-1

SUSPENDED PARTICULATE EMISSIONS RESULTING FROM THE OPERATION OF THE STAR LAKE SURFACE MINES

Mine	Emissions for Different Activities (tons/year)			
	Coal Process.	Coal Storage	Mining	Haul Road Dust
Peabody - Star Lake East	-	-	2645	520
Peabody P4	-	-	2645	1040
Chaco-Star Lake	-	-	12111	17
Chaco - P1 & P2	-	-	24222	351
Total	727	350	41623	1928

Total for all activities = 44628 tons/year.

TSP concentrations for 24-hour, 7-day, 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

Emissions from certain types of sources within the proposed mining complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon monoxide, nitrogen oxides, and sulfur oxides) from on and off mine sources such as vehicles and generators would not be significant. In addition, emissions from blasting and fires would be insignificant because of their intermittent nature. Although pollutant levels resulting from fires might be substantial, and the potential for their occurences is difficult to predict, there is difficulty in quantifying these emissions.

Table 8-2 presents federal and New Mexico ambient particulate standards, estimated background particulate levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual TSP levels resulting from total mine emissions. Maximum concentrations presented in this table are the highest TSP levels expected outside the mine boundary.

Modeling results show that the highest concentrations would occur in the vicinity of the western portion of the Star Lake Mine. Examination of Table 8-2 shows that the federal and state standards (for 24-hour and 7-day averaging times) would be violated. Highest concentrations are predicted to occur within the mine boundary and concentrations reported in Table 8-2 are those predicted to occur at the boundary. Maximum concentrations for all averaging times decrease rapidly with distance and concentrations would drop below levels specified in federal and New Mexico standards beyond 7.0 km from the mine boundary. The decrease

TABLE 8-2

AIR QUALITY IMPACT OF THE PEABODY COAL AND CHACO ENERGY
STAR LAKE SURFACE MINES

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1] Primary	Federal[1] Secondary	New Mexico[2]				
Annual	75	60	60	27	2.4	11	38
30-day	-	-	90	27	2.4	19	46
7-day	-	-	110	27	4.0	351	378
24-hour	260	150	150	27	4.0	639	666

[1] Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2] New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3] As measured from the loading facility the Star Lake West surface mine.

[4] Including background.

in maximum 24-hour TSP levels with distance is presented in Figure 8-1. Concentrations presented in this figure do not include the background contribution.

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively, in Class II areas (the entire United States is currently designated Class II). Modeling results show that these levels would be exceeded out to downwind distances from the mine boundary of 4.6 km for the annual case and 40 km for the 24-hour case.

Meteorological conditions associated with highest 24-hour and 7-day TSP levels are those which cause the greatest amount of wind-generated dust. These conditions typically include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollutant meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during these conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data for Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 - 2 times per year.

Increased TSP concentrations resulting from particulate emissions from the mining operations would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind through the dispersing plume. However, the general visibility reduction

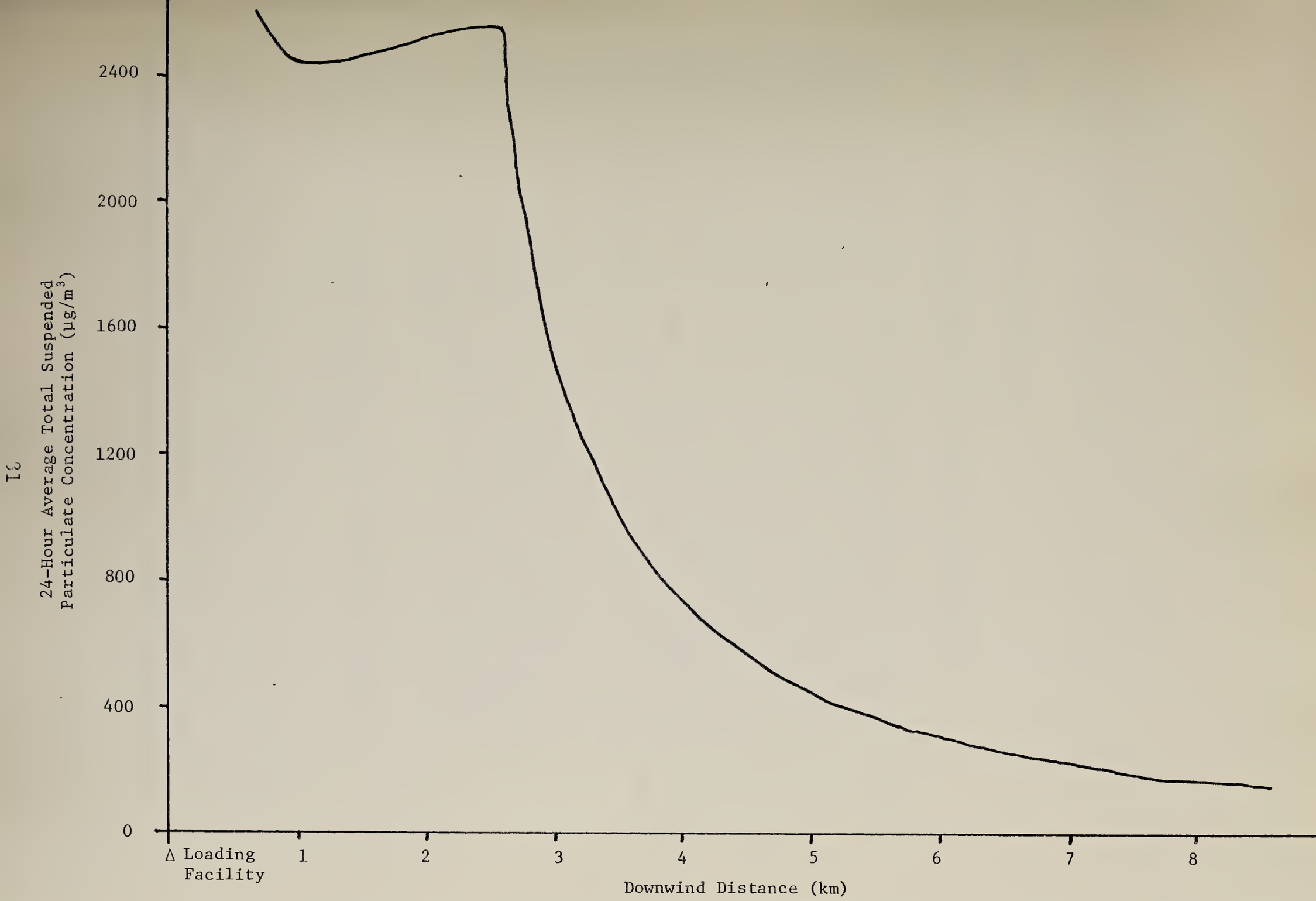

Figure 8-1. Maximum 24-hour Average Concentrations of Total Suspended Particulates Downwind from the Star Lake West Surface Mine of Chaco Energy

within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentrations, the normal regional visibility on an otherwise clear day would be about 38 km.

8.3 Mitigating Measures

8.3.1 Measures Required by Law or Regulation

The most significant degradation of air quality which would be caused by the proposed surface mining actions at the Peabody Coal Company Chaco Energy and Cherokee and Pittsburg Star Lake Surface Mines would occur for total suspended particulates (TSP). The control of particulate matter from coal burning equipment and from mining and preparation plants is specified by New Mexico Health and Social Services Board regulations numbers 401, 504, and 672. Some of the controls for "fugitive" particulate emissions from coal mining and preparation plants specified in Regulation 672 include:

1. The installation of hoods, shields, or sprays on all crushers, conveyors, screens, cleaners, hoppers, and chutes, necessary to prevent particulate matter from becoming airborne.

2. The spraying or other treatment of main coal hauling roads.

The U.S. Department of Interior has also established regulations controlling the operation of coal mining (43 CFR, Subpart 3041.1:2(b)(2)(v)). These regulations require applicant to describe in detail the strategies which he would apply for controlling emission of air pollutants. Major aspects of the

regulation is the control of fugitive particulate emissions by revegetation. In the long-term, revegetation and land reclamation can be nearly 100 percent effective in controlling fugitive particulate emissions. The short-term control would rely on measures such as size and timing of blasting and procedures for preventing fires which will be specified by the applicants. It is difficult, however, to estimate the efficiency of these controls.

The U.S. Department of Interior, USGS, has promulgated rules and regulations for controlling emissions from coal mining (30 CFR 211). To comply with these regulations and rules, an applicant must enumerate in detail the control measures that would be applied for blasting, fire prevention, and controlling wind erosion. To ensure the maintenance of ambient air quality standards, monitoring of air pollutant concentrations is also required.

The fugitive dust emissions from construction are required to be controlled in the short-term by washing, wetting down, or otherwise treating or covering vehicles, road, and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading. In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives should control fugitive dust emissions.

In addition, the New Mexico State Bureau of Mines and Mineral Resources has established the "Regulations of the Coal Surfacemining Commission Pursuant to New Mexico Coal Surfacemining Act" Chapter 68, Laws 1972, dated January 3, 1973. These regulations require that the disturbed areas be revegetated.

8.3.2 Other Mitigating Measures

The major air quality impact is expected from fugitive dust emissions from surface mining and also from construction.

Predicted levels of total suspended particulates (TSP) would exceed state and national standards. Both the annual and 24-hour significant deterioration increments for TSP would be exceeded outside the mine.

Fugitive dust may be minimized by watering at transfer points, such as conveyor ends or loading stations. Dust collection systems may be installed over coal treatment sources such as crushers and sorters. Attention to cleanliness and accidental spill prevention would reduce fugitive dust emissions.

The most significant long-term mitigating measure for fugitive dust is the immediate reclamation of mined surfaces. As mining proceeds, previously mined areas would not continue to be a source of emissions. Reclamation would include grading, seeding, vegetation planting, landscaping, and other mitigating alternatives.

Blasting operations unavoidably force particulates into the atmosphere but the detrimental effects can be minimized by careful blast design so as to reduce the amount of very small particles that would linger. This can be accomplished by proper sequencing and limiting the amounts of explosive. Coal fires as a potential pollutant source can be largely prevented by careful design of overburden piles and other preventive action. Prompt and thorough fire fighting in the case of accidental fire can prevent a major pollution problem.

A continuous air monitoring program can be employed to determine background concentrations of TSP and measure the success of abatement programs.

Particular levels associated with vehicular traffic can be minimized by attention to cleanliness of vehicles, wetting down areas of potential fugitive emissions, and by restricting unauthorized use of access roads.

Non-methane hydrocarbon (NMHC) emissions are primarily the result of transportation sources and solid waste disposal. Open burning should be minimized and regular inspection and maintenance of light duty vehicles and their emission control devices would reduce NMHC and oxidant levels. Hydrocarbon (HC) control devices should be considered for the off-the-road vehicles.

8.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emission of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the construction and operation of surface mines and coal handling facilities would be controlled with dust suppression systems and other procedures including land reclamation and re-vegetation, wetting of road surfaces, and special blasting techniques. Fugitive dust emissions from off-road vehicles would be unavoidable although they will be rigorously controlled by watering. Even though the fugitive dust emissions would be stringently controlled at the surface mines, the violation of the suspended particulate standards would be unavoidable in the vicinity of the property boundaries of the mines.

A loss of visibility would occur near the site because of emissions of very fine particulates to the atmosphere. The decrease in regional visibility due to the rise in fugitive emissions would not be significant.

8.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

The major source of degradation of the short-term air quality would be the emissions of fugitive dust from coal mining, transporting, and handling. Fugitive dust would be entrained into the atmosphere by wind erosion of the coal and spoil storage area, and unreclaimed areas, by the off-road vehicles, by the transport of the coal, and by the cleaning, processing, and loading of coal. Coal handling facilities would be a temporary source of fugitive particulates.

These fugitive emissions would reduce visibility. Because the residence time of the particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the surface mines is not equivalent to the current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

8.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at mines may cause a small change in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered.

9.0 THE BISTI SURFACE COAL MINE OF WESTERN COAL COMPANY

9.1 Description of the Air Quality

No ambient air quality data exists for this site. The total suspended particulate (TSP) concentrations measured at Star Lake are assumed to be representative of the air quality in the Western Coal Surface Mine area. The annual mean concentration of 27 $\mu g/m^3$ is less than half the federal secondary and state air quality standards. While the maximum 24-hour concentration observed at Star Lake is 214 $\mu g/m^3$, the second highest 24-hour concentration is 67 $\mu g/m^3$, which is well below the federal secondary and state air quality standards.

The TSP background concentrations for the annual and 24-hour averages is assumed as 27 $\mu g/m^3$. The background concentrations for other pollutants for this site in the rural central sub-area of the Star Lake - Bisti ES Region are discussed in Section 2.1.2 of Volume 2, the Regional Assessment of Air Quality. The visibility observed for the Salt River Project site is presented in Volume 3, the Discussions of Climatology of the Individual Proposed Actions.

9.2 Air Quality Impact of the Proposed Actions

9.2.1 Emissions

To predict the air quality impact of the proposed Western Coal's Bisti surface mine, emissions from all facets of the proposed mining and support activities must be determined. These emissions can then be expressed as ambient air pollutant concentrations by mathematical modeling of emission rates, source geometry and meteorological conditions.

The only significant emissions from the Bisti mine would be particulate matter generated by wind erosion and by mining activities. Emissions of gaseous pollutants from fuel combustion sources (vehicles and generators) would be very small and would not increase background levels measurably. Emissions from blasting and from unexpected ignition of coal fires would not be significant. In addition, emissions from activities during the construction phase would be insignificant because of their intermittent nature. These emissions would be much lower than those generated by the mine operation.

Particulate emissions would be generated during the life of the mine (1981-2026) by the following activities:

1. Mining: including vehicular-generated dust and wind erosion of the mining pit, overburden piles, and other unvegetated land.

2. Haul Road Dust.

3. Coal Storage: loading, unloading, and wind erosion of the coal storage pile.

4. Coal Preparation and Processing: crushing, grinding, sorting, screening, drying.

Emission estimates were not provided by Western Coal Company but were calculated by methods discussed in Appendix A of the Regional Assessment. Total emissions calculated by these methods are presented in Table 9-1. The numbers presented in this table are total annual particulate emissions.

TABLE 9-1

SUSPENDED PARTICULATE EMISSIONS RESULTING FROM THE OPERATION OF THE BISTI SURFACE MINE - WESTERN COAL

Activity	Emission (Tons/Year)
Coal Processing	150
Coal Storage	230
Mining	4844
Haul Road Dust	22
Total	5246

9.2.2 Resultant Air Quality

The potential air quality impacts of the Western Coal Company Bisti Coal Surface Mine were addressed by determining ambient total suspended particulate (TSP) concentrations which would result from the mines emissions. Short-term, intermediate-term, and long-term atmospheric dispersion models were applied to emissions from the mine site to determine TSP concentrations for 24-hour, 7-day, 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

Emissions from certain types of sources within the proposed mining complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon monoxide, nitrogen oxides, and sulfur oxides) from on and off mine sources such as vehicles and generators would not be significant. In addition, emissions from blasting and fires would be insignificant because of their intermittent nature. Although pollutant levels

resulting from fires might be substantial, there is difficulty in quantifying these emissions and the potential for their occurrences is difficult to predict.

Table 9-2 presents federal and New Mexico ambient particulate standards, estimated background particulate levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual TSP levels resulting from total mine emissions. Maximum concentrations presented in this table are the highest TSP levels expected outside the mine boundary.

Examination of Table 9-2 shows that all federal and state standards (annual average and 24-hour) would be violated. Highest concentrations are predicted to occur within the mine boundary and concentrations reported in Table 9-2 are those predicted to occur at the boundary. Maximum concentrations for all averaging times decrease rapidly with distance and concentrations would drop below levels specified in federal and New Mexico standards beyond 2.7 km from the mine boundary. Figure 9-1 depicts the decrease in maximum 24-hour TSP concentrations with downwind distance. Concentrations presented in this figure do not include the background contribution.

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively, in Class II areas (the entire United States is currently designated Class II). Modeling results show that these levels would be exceeded out to downwind distances from the mine boundary of 2.0 km for the annual case and 7.9 km for the 24-hour case.

TABLE 9-2

AIR QUALITY IMPACT OF THE WESTERN COAL COMPANY BISTI COAL SURFACE MINE

PREDICTED MAXIMUM TOTAL SUSPENDED PARTICULATE CONCENTRATIONS ($\mu g/m^3$)

Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum TSP Concentration
	Federal[1]		New Mexico[2]				
	Primary	Secondary					
Annual	75	60	60	27	0.6	104	131
30-day	-	-	90	27	0.6	182	209
7-day	-	-	110	27	0.6	245	272
24-hour	260	150	150	27	0.6	445	472

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded).

[3]As measured from the loading facility.

[4]Including background.

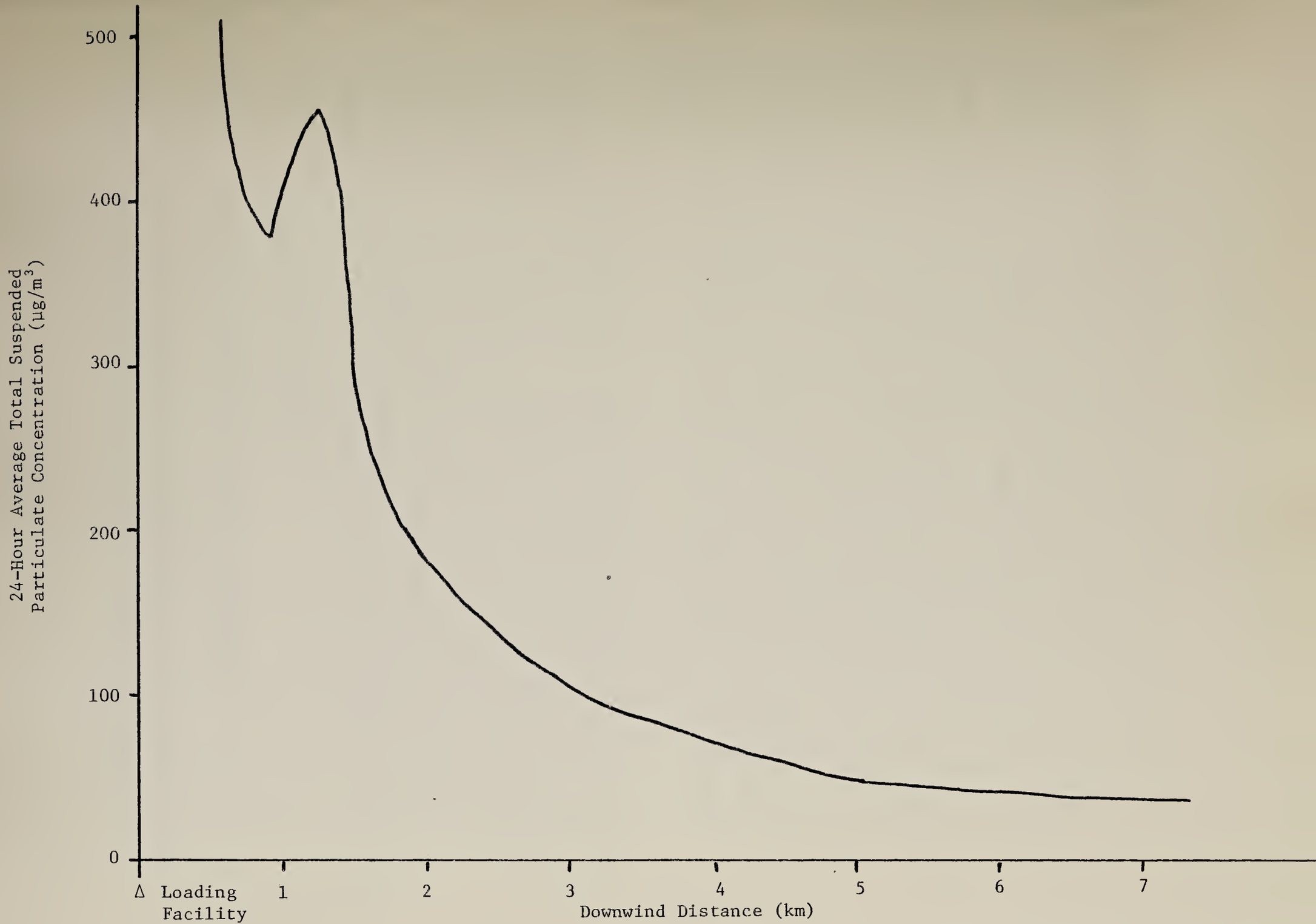

Figure 9-1. Maximum 24-hour Average Concentration of Total Suspended Particulates Downwind from the Bisti Surface Mine of Western Coal Company

Meteorological conditions associated with highest 24-hour and 7-day TSP levels are those which cause the greatest amount of wind-generated dust. These conditions typically include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollutant meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during these conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data for Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 - 2 times per year.

Increased TSP concentrations resulting from particulate emissions from the Bisti Surface mining operation would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind through the dispersing plume. However, the general visibility reduction within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentrations, the normal regional visibility on an otherwise clear day would be about 40 km.

9.3 Mitigating Measures

9.3.1 Measures Required by Law or Regulation

The most significant degradation of air quality which would be caused by the proposed surface mine would occur for

total suspended particulates (TSP). The control of particulate matter from coal burning equipment and from mining and preparation plants is specified by New Mexico Health and Social Services Board regulations numbers 401, 504, and 672. Some of the controls for "fugitive" particulate emissions from coal mining and preparation plants specified in Regulation 672 include:

1. The installation of hoods, shields, or sprays on all crushers, conveyors, screens, cleaners, hoppers, and chutes, necessary to prevent particulate matter from becoming airborne."

2. The spraying or other treatment of main coal handling roads.

The U.S. Department of Interior has also established regulations controlling the operation of coal mining (43 CFR, Subpart 3041.1:2(b)(2)(v)). These regulations require the applicant to describe in detail the strategies which he would apply for controlling emission of air pollutants. Major aspects of the regulation is the control of fugitive particulate emissions by revegetation. In the long-term, revegetation and land reclamation can be nearly 100 percent effective in controlling fugitive particulate emissions. The short-term control would rely on measures such as size and timing of blasting and procedures for preventing fires which will be specified by the applicants. It is difficult, however, to estimate the efficiency of these controls.

The U.S. Department of Interior, USGS, has promulgated rules and regulations for controlling of emissions from coal mining (30 CFR 211). To comply with these regulations and rules, an applicant must enumerate in detail the control measures that

would be applied for blasting, fire prevention, and controlling wind erosion. To ensure the maintenance of ambient air quality standards, monitoring of air pollutant concentrations is also required.

In addition, the New Mexico State Bureau of Mines and Mineral Resources has established the "Regulations of the Coal Surfacemining Commission Pursuant to New Mexico Coal Surfacemining Act" Chapter 68, Laws 1972, dated January 3, 1973. These regulations require that the disturbed areas be revegetated.

9.3.2 Other Mitigating Measures

The major air quality impact is expected from fugitive dust emissions from surface mining. Predicted levels of total suspended particulates (TSP) would exceed state and national standards. The TSP significant deterioration increments would be exceeded for the annual and 24-hour average outside the mine boundary.

Fugitive dust may be minimized by watering at transfer points, such as conveyor ends or loading stations. Dust collection systems may be installed over coal treatment sources such as crushers and sorters. Attention to cleanliness and accidental spill prevention would reduce fugitive dust emissions.

The most significant long-term mitigating measure for fugitive dust would be the immediate reclamation of mined surfaces. As mining proceeds, previously mined areas would not continue to be a source of emissions. Reclamation would include grading, seeding, vegetation planting, landscaping, and other mitigating alternatives.

Blasting operations unavoidably force particulates into the atmosphere but the detrimental effects can be minimized by careful blast design to reduce the amount of very small particles emitted. This can be accomplished by proper sequencing and limiting the amounts of explosive. Coal fires as a potential pollutant source can be largely prevented by careful design of overburden piles and other preventive action. Prompt and thorough fire fighting in the case of accidental fire can prevent a major pollution problem.

A continuous air monitoring program can be employed to determine background concentrations of TSP and measure the success of abatement programs.

Particulate levels associated with vehicular traffic can be minimized by attention to cleanliness of vehicles, wetting down areas of potential fugitive emissions, and by restricting unauthorized use of access roads.

Non-methane hydrocarbon (NMHC) emissions are primarily the result of transportation sources and solid waste disposal. Open burning should be minimized and regular inspection and maintenance of light duty vehicles and their emission control devices would reduce NMHC and oxidant levels. Hydrocarbon (HC) control devices should be considered for the off-the-road vehicles.

9.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emission of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the construction and operation of surface mines and coal handling facilities would be controlled with dust suppression

systems and other procedures including land reclamation and revegetation, wetting of road surfaces, and special blasting techniques. Fugitive dust emissions from off-road vehicles would be unavoidable although they would be rigorously controlled by watering. Even though the fugitive dust emissions would be stringently controlled at the surface and underground mines, the violation of the federal and New Mexico suspended particulate standards would be unavoidable in the vicinity of the property boundaries of the mines.

A loss of visibility would occur near the site because of the very fine particulate emission to the atmosphere. The decrease in regional visibility due to the rise in fugitive emissions would not be significant.

9.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

The major source of degradation of the short-term air quality would be the emissions of fugitive dust from coal mining, transporting, and handling. Fugitive dust would be entrained into the atmosphere by wind erosion of the coal and spoil storage area, and unreclaimed areas, by the off-road vehicles, by the transport of the coal, and by the cleaning, processing, and loading of coal.

These fugitive emissions and the aerosol formed in the atmosphere from sulfur dioxide, nitrogen oxide, and hydrocarbons would reduce visibility. Because the residence time of particulates ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the surface and underground mines is not equivalent to the current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

9.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at mines may cause a small change in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered.

10.0 THE 115 MILES OF RAIL LINE AND UNIT TRAINS OF THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY

10.1 Description of the Air Quality

No ambient air quality data exists in the vicinity of the site. The total suspended particulate (TSP) concentrations measured at Star Lake are assumed to be representative of the air quality in the area of the Atchison, Topeka and Santa Fe (AT&SF) Railway Project. The annual mean concentration of 27 $\mu g/m^3$ is less than half the federal secondary and state air quality standards. While the maximum 24-hour concentration observed at Star Lake is 214 $\mu g/m^3$, the second highest 24-hour concentration is 67 $\mu g/m^3$, which is well below the federal secondary and state air quality standards.

The TSP background concentrations for the annual and 24-hour averages is assumed to be 27 $\mu g/m^3$. The background concentrations for other pollutants for this site in the rural central sub-area of the Star Lake - Bisti ES region are discussed in Section 2.1.2 of Volume 2, the Regional Assessment of Air Quality. The visibility observed for the site is presented in Volume 3, the Discussion of Climatology of the Individual Proposed Actions.

10.2 Air Quality Impact of the Proposed Actions

10.2.1 Emissions

Primary emissions from the operation of unit trains on 115 miles of rail line by the Atchison, Topeka and Santa Fe Railway can be divided into emissions resulting from the construction phase and emissions from the operational phase. During the construction phase (1978-1980) emissions would be intermittent and localized and have little impact beyond the right-of-way of the railroad.

Emissions during the operational phase of the railroad (at least 35 years beginning in 1980) would be due to diesel combustion of the unit trains. These emissions were calculated for a 33 mile stretch of the 115 mile line by the applicant using emission factors developed by EPA. Emissions for the other 82 miles were not supplied by the applicant. It was assumed, however, that the emissions for this portion could be determined from the emissions for the 33 mile stretch by multiplying these emissions by 82/33. Using this method, maximum annual emissions occurring during the years of heaviest unit train activity (1982-2017) would be 244 tons/year of particulates, 558 tons/year of SO_2, and 3610 tons/year NO_2.

10.2.2 Resultant Air Quality

Emissions of SO_2, NO_2, particulates, CO, and hydrocarbons from operation of unit trains along the Atchison, Topeka and Santa Fe Railway 115 mile rail line would be relatively low, distributed over a very large area, and of an intermittent nature at any one location. Therefore, air quality levels of criteria pollutants resulting from operation of unit trains along the proposed 115 mile line would be insignificant.

10.3 Mitigating Measures

10.3.1 Measures Required by Law or Regulation

Increases in total suspended particulates (TSP), SO_2, NO_2, and hydrocarbon levels are the primary ambient air quality

concern in the development of railway lines. The two major pollution sources are the localized short-term construction operations which are responsible for fugitive dust emissions and the long-term diesel locomotive gaseous and particulate emissions generated when rail lines commence operation.

The specific regulations pertaining to the control of smoke from diesel-powered locomotives are limited to permissible opacity levels cited under Regulation 401 by the New Mexico Environmental Improvement Agency as follows:

> Regulation Number 401 of the Ambient Air Quality Standards Control Regulations adopted by the New Mexico Health and Social Services Board on January 23, 1970, is amended to read:
>
> "401. Regulation to Control Smoke
>
> E. No person shall permit, cause, suffer or allow the emission into the open air of any smoke having a density of shade greater than #1 on the Ringelmann scale for any period greater than ten seconds from any diesel-powered locomotive operating below 8,000 feet (mean sea level).
>
> F. No person shall permit, cause, suffer or allow the emission into the open air of any smoke having a density of shade greater than #2 on the Ringelmann scale for any period greater than ten seconds from any diesel-powered locomotive:

1. operating above 8,000 feet (mean sea level); or

2. involved in switching and railroad yard use.

G. This regulation does not apply to emissions from diesel-powered locomotives if the emissions are a direct result of a cold engine start-up."

The emissions for particulates, sulfur dioxide, and nitrogen dioxide are limited for oil combustion sources with heat inputs greater than 10^{12} Btu per year by New Mexico regulations number 501, 605, and 606.

"501. Oil Burning Equipment--Particulate Matter

No person owning or operating oil burning equipment having a heat input of greater than 1,000,000 million (10^{12}) British Thermal Units per year per unit shall permit, cause, suffer or allow particulate matter emissions to the atmosphere in excess of .005 pounds per million British Thermal Units of heat input."

"605. Oil Burning Equipment--Sulfur Dioxide

No person owning or operating oil burning equipment having a heat input of greater than 1,000,000 million (10^{12}) British Thermal Units per year per unit shall permit, cause, suffer

or allow nitrogen dioxide emissions to the atmosphere in excess of .3 pounds per million British Thermal Units of heat input."

Fugitive dust emissions from construction are required to be controlled in the short-term by washing, wetting down or otherwise treating or covering vehicles, roads and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading.

10.3.2 Other Mitigating Measures

The development of rail lines would increase the ambient suspended particulate concentrations during their construction and operation. The fugitive dust emissions from construction are required to be controlled in the short-term by washing, wetting down, or otherwise treating or covering vehicles, road, and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading. In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives should control fugitive dust emissions.

10.4 Unavoidable Adverse Air Quality Impact of the Proposed and Possible Future Actions

The increase of the emission of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The exhaust emissions from diesel locomotives would be minimal, but unavoidable. The fugitive dust released from the construction and operation of railroads would be controlled to the extent possible with procedures including land reclamation and revegetation.

Although small, local decreases of visibility resulting from the construction of the railroad would occur, they would be unavoidable.

10.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

Fugitive dust would be entrained into the atmosphere by the railroad transport of the coal. Construction of railroads would be a temporary source of fugitive particulates.

These fugitive emissions and the aerosol formed in the atmosphere from sulfur dioxide, nitrogen oxide, and hydrocarbons would reduce visibility. Because the residence time of particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the area disturbed by construction is not equivalent to the current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

10.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at railroad lines may cause a small change in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered. If reclamation and revegetation were complete, the air quality impact of the lines would be reversible.

11.0 THE 105 MILE RAILROAD LINE OF THE CON PASO (CONSOLIDATION COAL COMPANY - EL PASO NATURAL GAS COMPANY)

11.1 Description of the Air Quality

No ambient air quality data exists for the site. The total suspended particulate (TSP) concentrations measured at Star Lake are assumed to be representative of the air quality in the area of the Consolidation Coal Company and El Paso Natural Gas Company Project. The annual mean concentration of 27 $\mu g/m^3$ is less than half the federal secondary and state air quality standards. While the maximum 24-hour concentration observed at Star Lake is 214 $\mu g/m^3$, the second highest 24-hour concentration is 67 $\mu g/m^3$, which is well below the federal secondary and state air quality standards.

The TSP background concentrations for the annual and 24-hour averages is assumed to be 27 $\mu g/m^3$. The background concentrations for other pollutants for this site in the rural central sub-area of the Star Lake - Bisti ES region are discussed in Section 2.1.2 of Volume 2, the Regional Assessment of Air Quality. The visibility observed for the site is presented in Volume 3, the Discussions of Climatology of the Individual Proposed Actions.

11.2 Air Quality Impact of the Proposed Actions

11.2.1 Emissions

Primary emissions from the operation of unit trains along approximately 10 miles of Consolidation Coal Company and El Paso Natural Gas Company rail line outside the Navajo Indian Reservation can be divided into emissions resulting from the construction phase and emissions from the operational phase.

During the construction phase (1977-1981) emissions would be intermittent and local and would have little impact beyond the right-of-way of the railroad.

Emissions during the operational phase of the railroad (about 40 years beginning in 1982) would be due to diesel combustion of unit trains. These emissions were calculated by Consolidation Coal and El Paso Natural Gas Companies for the approximate 10-mile stretch of line from the Con Paso Mine to Gallup lying outside the Navajo Indian Reservation. SO_2 and particulate emissions were computed by multiplying computed NO_2 emissions by reported ratios of SO_2 and particulate emissions to NO_2 emissions. These ratios were calculated by the Atchison, Topeka and the Santa Fe Railway for a 33-mile stretch of line proposed for development in the Star Lake-Bisti ES region.

Maximum annual emissions during the years of heaviest unit train activity (1990-2022) would be 8.8 tons/year of particulates, 20.1 tons/year of SO_2, and 130.5 tons/year NO_2.

11.2.2 Resultant Air Quality

Emissions of SO_2, NO_2, particulates, and hydrocarbons from the 10-mile Consolidation Coal and El Paso Natural Gas Company railroad line would be very low. Particulate emissions would be 3 to 4 orders of magnitude lower than are postulated for the proposed surface and underground mines in the ES region and emissions of gaseous pollutants would be about 4 orders of magnitude lower than are postulated for the proposed Public Service Company of New Mexico power plant. Therefore, air quality levels of particulate resulting from operation of unit trains along the proposed 10-mile line would be insignificant.

11.3 Mitigating Measures

11.3.1 Measures Required by Law or Regulations

Increases in total suspended particulates (TSP), SO_2, NO_2, and hydrocarbon levels are the primary ambient air quality concern in the development of railway lines. The two major pollution sources are the localized short-term construction operations which are responsible for fugitive dust emissions and the long-term diesel locomotive gaseous and particulate emissions generated when rail lines commence operation.

The specific regulations pertaining to the control of smoke from diesel-powered locomotives are limited to permissible opacity levels cited under Regulation 401 by the New Mexico Environmental Improvement Agency as follows:

> Regulation Number 401 of the Ambient Air Quality Standards Control Regulations adopted by the New Mexico Health and Social Services Board on January 23, 1970, is amended to read:
>
> "401. Regulation to Control Smoke
>
> E. No person shall permit, cause, suffer or allow the emission into the open air of any smoke having a density of shade greater than #1 on the Ringelmann scale of any period greater than ten seconds from any diesel-powered locomotive operating below 8,000 feet (mean sea level).

F. No person shall permit, cause, suffer or allow the emission into the open air of any smoke having a density of shade greater than #2 on the Ringelmann scale for any period greater than ten seconds from any diesel-powered locomotive:

1. operating above 8,000 feet (mean sea level); or

2. involved in switching and railroad yard use.

G. This regulation does not apply to emissions from diesel-powered locomotives if the emissions are a direct result of a cold engine start-up."

The emissions for particulates, sulfur dioxide, and nitrogen dioxide are limited for oil combustion sources with heat inputs greater than 10^{12} Btu per year by New Mexico regulations number 501, 605, and 606.

"501. Oil Burning Equipment--Particulate Matter

No person owning or operating oil burning equipment having a heat input of greater than 1,000,000 million (10^{12}) British Thermal Units per year per unit shall permit, cause, suffer or allow particulate matter emissions to the atmosphere in excess of .005 pounds per million British Thermal Units of heat input."

"605. Oil Burning Equipment--Sulfur Dioxide

No person owning or operating oil burning equipment having a heat input of greater than 1,000,000 million (10^{12}) British Thermal Units per year per unit shall permit, cause, suffer or allow sulfur dioxide emissions to the atmosphere in excess of .34 pounds per million British Therma Units of heat input."

"606. Oil Burning Equipment--Nitrogen Dioxide

No person owning or operating oil burning equipment having a heat input of greater than 1,000,000 million (10^{12}) British Thermal Units per year per unit shall permit, cause, suffer or allow nitrogen dioxide emissions to the atmosphere in excess of .3 pounds per million British Thermal Units of heat input."

Fugitive dust emissions from construction are required to be controlled in the short-term by washing, wetting down or otherwise treating or covering vehicles, roads and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading. In the long-term, fugitive dust should be eliminated almost entirely by revegetation, surface compaction and sealing, and other effective land reclamation alternatives.

11.3.2 Other Mitigating Measures

The development of rail lines would increase the ambient suspended particulate concentrations during their construction and

operation. The fugitive dust emissions from construction are required to be controlled in the short-term by washing, wetting down, or otherwise treating or covering vehicles, road, and cargo as necessary to minimize the amount of fugitive dust emitted in transit and in loading. In the long-term, revegetation, surface compaction and sealing, and other effective land reclamation alternatives should be control fugitive dust emissions.

11.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emission of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The exhaust emissions from diesel locomotives would be minimal, but unavoidable. The fugitive dust released from the construction and operation of railroads would be controlled to the extent possible with procedures including land reclamation and revegetation.

Although small, local decreases of visibility resulting from the construction of the railroad would occur, they would be unavoidable.

11.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

Fugitive dust would be entrained into the atmosphere by the railroad transport of the coal. Construction of railroads would be a temporary source of fugitve particulates.

These fugitive emissions and the aerosol formed in the atmosphere from sulfur dioxide, nitrogen oxide, and hydrocarbons would reduce visibility. Because the residence time of particulates in the atmosphere ranges from a few hours to a few days,

the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the area disturbed by construction is not equivalent to the current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered.

11.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material at railroad lines may cause a small change in the local climate. The modification of the surface contours and albedo would irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized dispersion patterns and pollutant concentrations may be irreversibly altered. If reclamation and revegetation were complete, the air quality impact of the lines would be reversible.

12.0 THE FOUR 500 MW GENERATING UNITS AND TWO RELATED 345 KV (OR 500 KV) POWER LINES OF THE PUBLIC SERVICE COMPANY OF NEW MEXICO

12.1 Description of the Air Quality

No ambient air quality data exists for this site. The total suspended particulate (TSP) concentrations measured at Star Lake are assumed to be representative of the air quality at the site of the proposed 2000 mw coal-fired power plant to be constructed by Public Service Company of New Mexico. The annual mean concentration of 27 $\mu g/m^3$ is less than half the federal secondary and state air quality standards. While the maximum 24-hour concentration observed at the power plant site is 214 $\mu g/m^3$, the second highest 24-hour concentration is 67 $\mu g/m^3$, which is well below the federal secondary and state air quality standards.

The TSP background concentrations for the annual and 24-hour averages are assumed to be 27 $\mu g/m^3$. The background concencentrations for other pollutants for this site in the rural central sub-area of the Star Lake - Bisti ES region are discussed in Section 2.1.2 of Volume 2, the Regional Assessment of Air Quality. The visibility observed for the site is presented in Volume 3, the Discussions of Climatology of the Individual Proposed Actions.

12.2 Air Quality Impact of the Proposed Actions

12.2.1 Emissions

To predict the air quality impact of the proposed New Mexico Public Service Power Plant, emissions from all facets of

the proposed power generation and support activities must be determined. These emissions can be expressed as ambient air pollutant concentrations by mathematical modeling of emission rates, source parameters and meteorological conditions.

Significant emission of gaseous and particulate pollutants would result from the coal-fired generators and activities associated with their fueling. Emissions from the construction and operation of substations and transmission lines would not be significant. They tend to be intermittent, localized and small. Emission of gaseous pollutants from plant vehicles would also be small and would not be significant.

Emissions would be generated by power generating activities during the life of the plant (beginning in 1980) by the following activities:

1. Power generation: SO_2, NO_2, and particulates from the four 500 MW coal-fired generating units.

2. Coal storage: particulates from loading, unloading and wind erosion of coal storage.

Plant operating and emissions parameters examined in modeling the proposed power plant are presented in Table 12-1. Power plant pollutant emission rates, stack exit temperatures and flow rates, and the stack heights were supplied by Public Service Company of New Mexico. Particulate emissions from the coal storage were determined by methods discussed in Appendix A of the Regional Assessment.

TABLE 12-1

OPERATING AND EMISSION PARAMETERS FOR POWER PLANT UNITS - PUBLIC SERVICE COMPANY OF NEW MEXICO

Number of Stacks	4
Stack	400-500 ft*
Stack Exit Temperature	175°F
Volumetric Flow Rate (per stack)	1,630,920 actual ft^3/min (ACFM)
SO_2 Emission Rate (per stack)**	753 lb/hr
NO_x Emission Rate (per stack)**	2307 lb/hr
Particulate Emission Rate (per stack)**	10.3 lb/hr
Annual Capacity Factor	84 percent

* 400 ft. stack was modeled.

**At full load.

Annual emissions from the power plant and coal storage are summarized and totaled in Table 12-2.

TABLE 12-2

EMISSIONS RESULTING FROM OPERATION OF THE POWER PLANT - PUBLIC SERVICE COMPANY OF NEW MEXICO

	Emission (Tons/Year)		
Activity	Particulates	SO_2	NO_2
Power Generation	154	11212	34356
Coal Storage	3240	-	-
Total	3394	11212	34356

12.2.2 Resultant Air Quality

The potential air quality impacts of the Public Service Company of New Mexico Power Plant, transmission lines and sub-stations were assessed by determining ambient total suspended

particulate, SO_2, and NO_2 concentrations which would result from the facilities' emissions. Short-term, intermediate-term and long-term atmospheric dispersion models were applied to emissions from the plant site to determine concentrations for 24-hour, 7-day, 30-day, and annual averaging periods. Modeling techniques and meteorological inputs used in the air quality impact assessment are discussed in Appendix C of the Regional Assessment.

Emissions from certain types of sources within the proposed power plant complex would be insignificant and therefore were not included in the modeling analysis. Combustion emissions of particulates and gaseous pollutants (hydrocarbons, carbon monoxide, nitrogen oxides and sulfur oxides) from sources such as vehicles and equipment would not be significant.

Table 12-3 presents federal and New Mexico ambient air quality particulate standards, estimated background pollutant levels for the site area, and predicted maximum 24-hour, 7-day, 30-day, and annual pollutant levels resulting from total plants' emissions. Maximum concentrations presented in this table are the highest levels expected outside the plant boundary.

Examination of Table 12-3 shows no state or federal ambient air quality standards would be violated. Highest concentrations of SO_2 and NO_2 are predicted to occur in regions of higher terrain, 12.9 km to the east of the power plant. Maximum concentrations of total suspended particulates would occur at the plant boundary as a result of emissions from coal storage and handling. Figures 12-1, 12-2, and 12-3 present the downwind variation of maximum 24-hour average TSP, SO_2, and NO_2 concentrations. Concentrations presented in these figures do not include the background contributions.

TABLE 12-2

AIR QUALITY IMPACT OF THE PUBLIC SERVICE COMPANY OF NEW MEXICO POWER PLANT FACILITY

PREDICTED MAXIMUM POLLUTANT CONCENTRATIONS ($\mu g/m^3$)

Pollutant	Averaging Period	Ambient Air Quality Standards			Estimated Background Level	Distance[3] to Point of Maximum Impact (km)	Maximum Predicted TSP Concentration	Total[4] Maximum Concentration
		Federal[1] Primary	Federal[1] Secondary	New Mexico[2]				
TSP	Annual	75	60	60	27	2.4	10	37
	30-day	-	-	90	27	2.4	17	44
	7-day	-	-	110	27	2.4	18	45
	24-hour	260	150	150	27	2.4	33	60
SO_2	Annual	80	-	43[5]	-	32	1.8	1.8
	24-hour	365	-	216[6]	-	12.9	42	42
	3-hour	-	1300	-	-	12.9	212	212
NO_2	Annual	100	100	78[7]	-	32	5.4	5.4
	24-hour	-	-	156[6]	-	12.9	130	130

[1]Title 40 CFR Part 50 National Ambient Air Quality Standards (standards other than those based on annual averages or annual geometric means, are not to be exceeded more than once a year).

[2]New Mexico Air Quality Control Regulations 201. Ambient Air Quality Standards, April 19, 1974 (standards are values that are not to be equalled or exceeded.

[3]As measured from the mine pit.

[4]Including background.

[5].02 ppm.

[6].10 ppm.

[7].05 ppm.

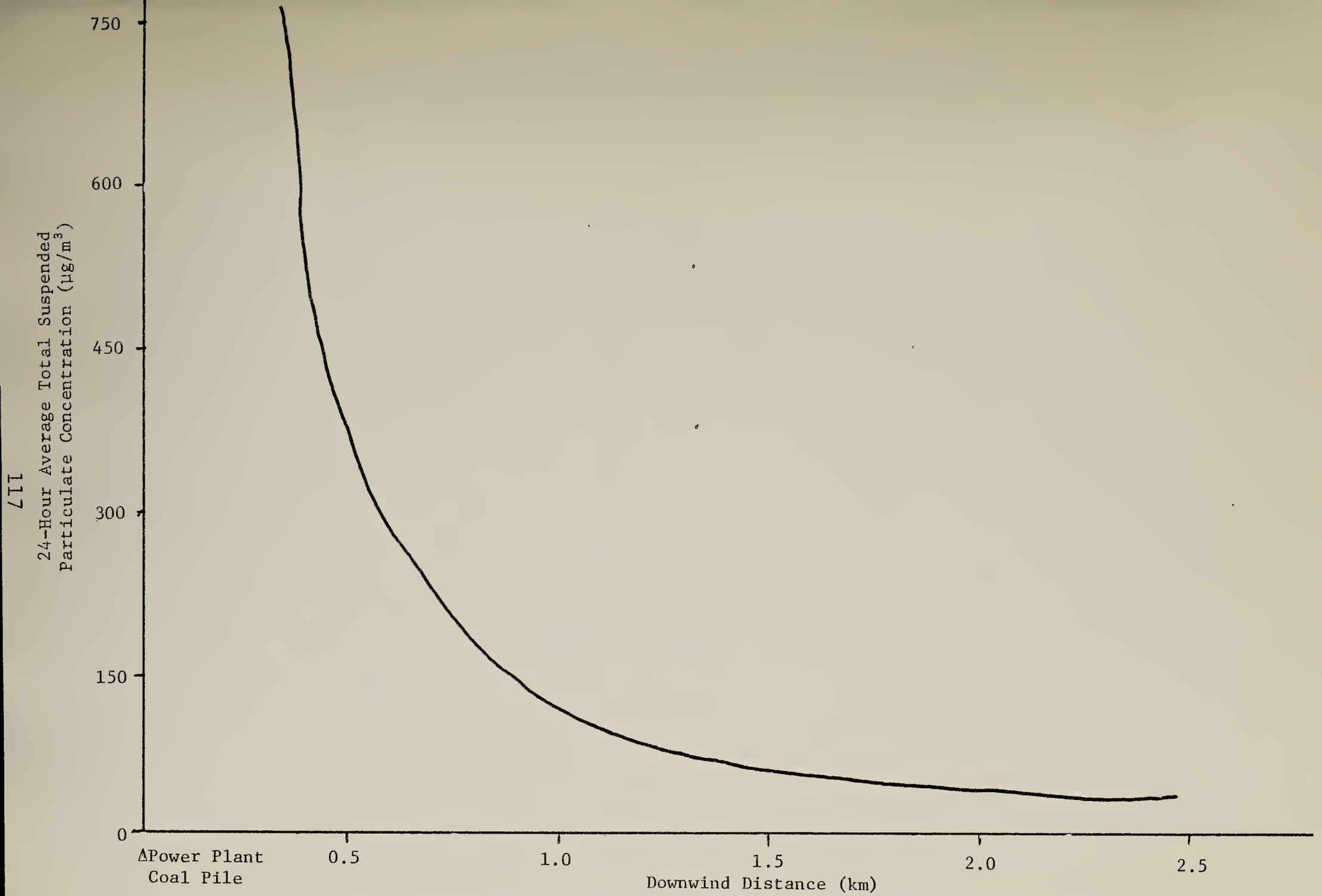

Figure 12-1. Maximum 24-hour Average Concentrations of Total Suspended Particulates Downwind from the Four 500 mw Generating Units of the Public Service Company of New Mexico

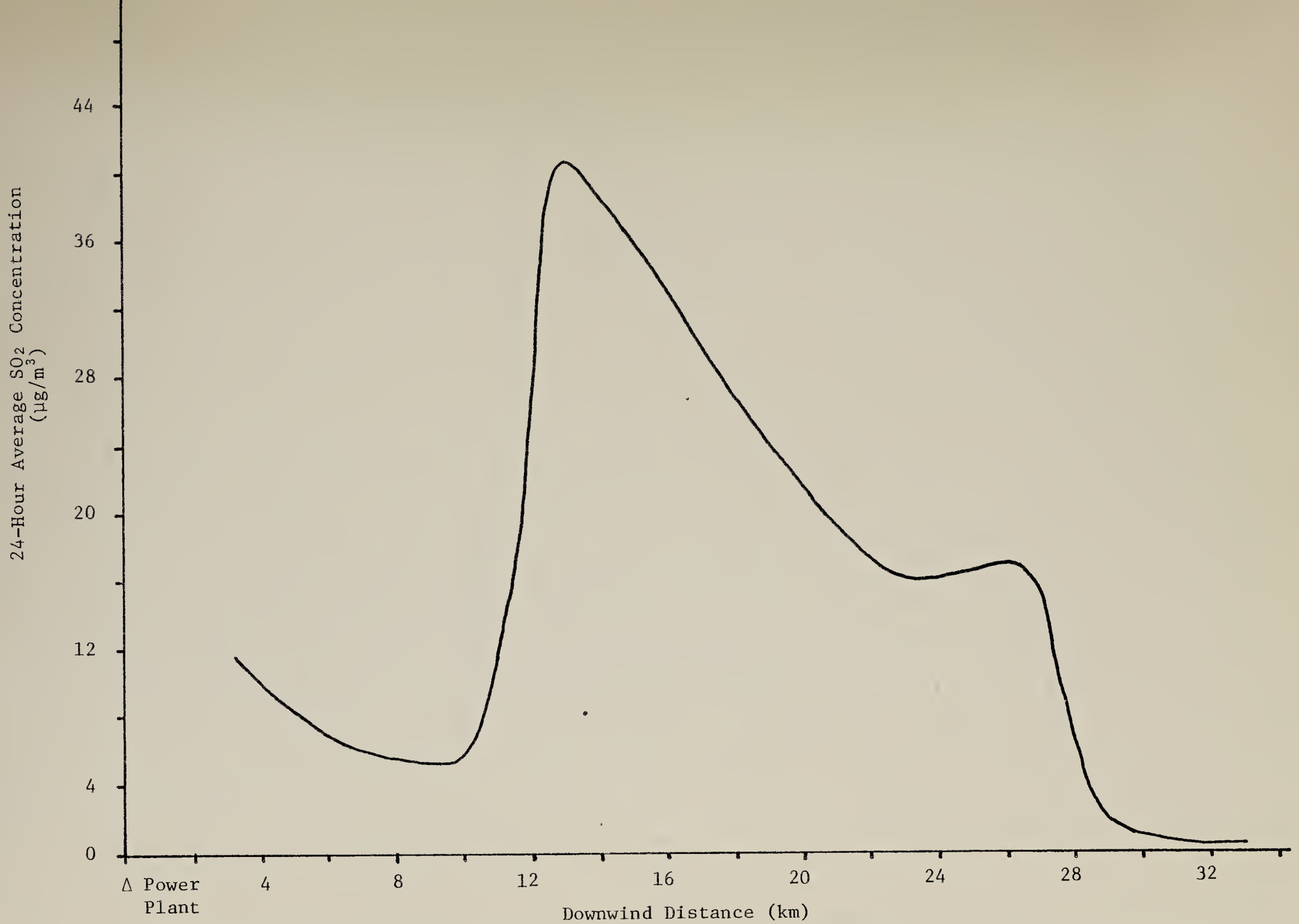

Figure 12-2. Maximum 24-Hour Average Concentration of SO_2 Downwind from the Four 500 mw Generating Units of the Public Service Company of New Mexico

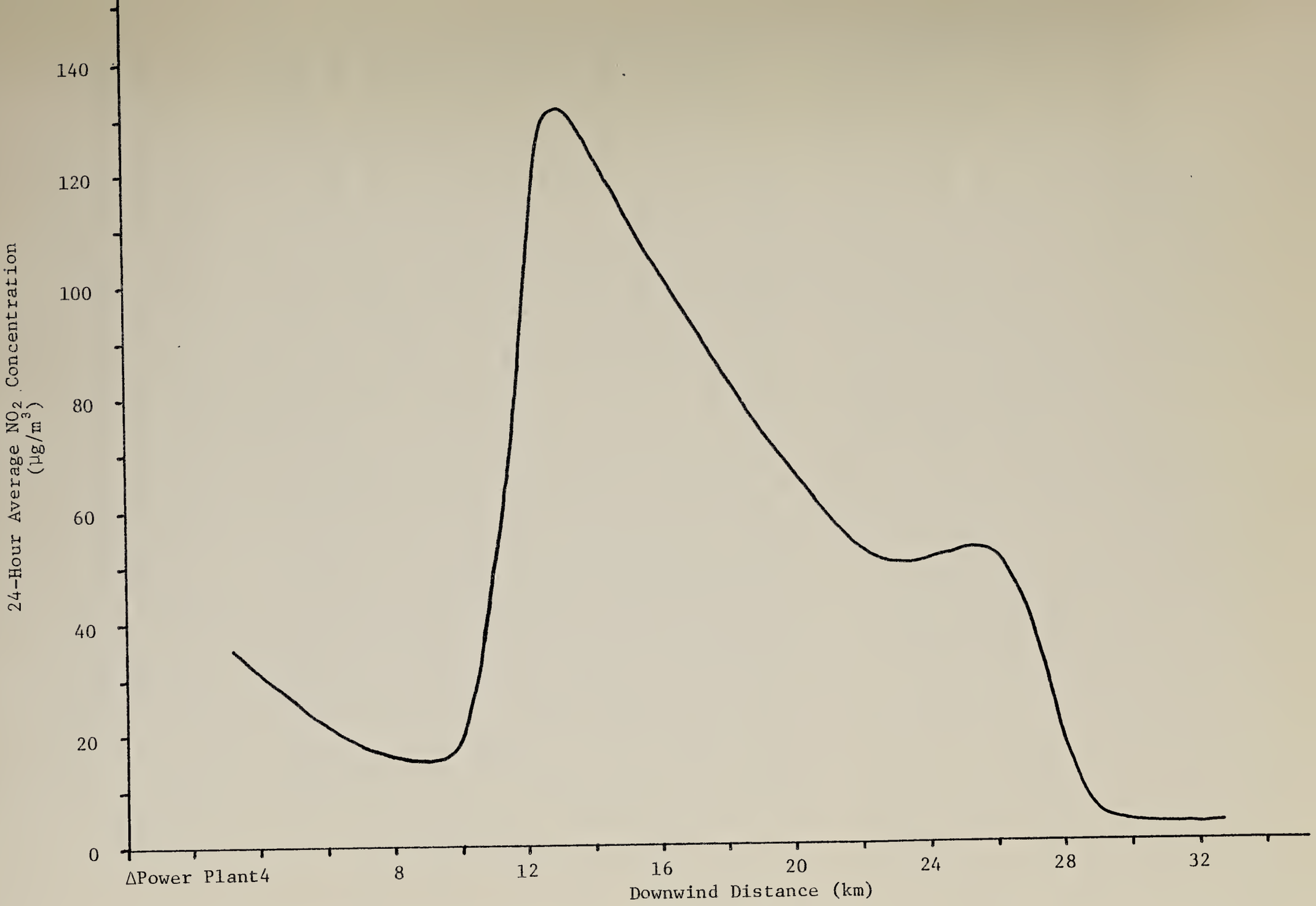

Figure 12-3. Maximum 24-Hour Average Concentration of NO_2 Downwind from the Four 500 mw Generating Units of the Public Service Company of New Mexico

The EPA significant deterioration guidelines specify that incremental increases in maximum 24-hour average and annual geometric mean TSP concentrations resulting from the operation of new sources may not exceed 30 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively, in Class II areas (the entire country is currently designated Class II). Also, annual average SO_2 levels may not exceed 15 $\mu g/m^3$, 24-hour levels may not exceed 100 $\mu g/m^3$ and 3-hour levels may not exceed 700 $\mu g/m^3$. Modeling results show that the allowable 24-hour increment for TSP would be exceeded out to downwind distances from the coal storage pile of 2.4 km. The allowable increments of SO_2 would not be exceeded.

Meteorological conditions associated with highest 24-hour and 7-day TSP levels from the power plant facility are those which cause the greatest amount of wind-generated dust from the coal storage activities. These conditions typically include persistent wind directions, near neutral stabilities and moderate wind speeds. This dispersion regime provides minimum dilution and pollution meander and at the same time results in large wind erosion emissions. It was found that maximum 24-hour and 7-day TSP levels would be higher during these conditions than during 24-hour and 7-day spans including periods of very light winds and stable conditions. Although these meteorological conditions often give rise to highest short-term pollutant concentrations from low-level releases, they result in very little wind-generated dust. Examination of statistical meteorological data for Farmington, New Mexico, for 1964 shows that these conditions should occur no more often than about 1 -2 times per year.

Highest concentrations of SO_2 and NO_2 would occur during meteorological conditions which would cause plumes from the four stacks to be advected into distant regions of higher terrain during stable nighttime conditions. During the period from mid-morning until early afternoon, high ground-level

concentrations would occur nearer the plant as stable plumes, trapped within the stable nighttime inversion layer are brought to the ground by ground-based turbulent mixing. During this meteorological regime highest concentrations would occur with light to moderate wind speeds and minimum meander in the wind direction. Examination of statistical meteorological data for Farmington, New Mexico, for 1964 show that these conditions should occur no more often than about 1 to 2 times per year.

Increased TSP concentrations resulting from particulate emissions from the power plant operations would reduce the visibility in the area. Minimum visibilities would be experienced by an observer standing downwind of the mine and looking upwind through the dispersing plume. However, the general visibility reduction within the region around the mine would be much less. Using the visibility prediction model described in Appendix C as applied to predicted annual average concentration, the normal regional visibility on an otherwise clear day would be about 48 km.

12.3 Mitigating Measures

12.3.1 Measures Required by Law or Regulation

The primary pollutants associated with generation and distribution of electricity are fugitive dust due to construction operations and coal storage, and fly ash, sulfur dioxide, and oxides of nitrogen from coal burning. Fugitive dust emissions from construction must be controlled by washing, wetting down or otherwise treating or covering vehicles, roads and cargo as necessary to minimize the amount of dust emitted in transit and in loading. Long-term fugitive dust must be minimized by revegetation, surface compaction or sealing, or other effective alternatives for land reclamation.

Pollutant emissions from the proposed coal-fired power plant would be limited by federal new source performance standards (NSPS) and by New Mexico Air Quality Control Regulations which are considerably more stringent than NSPS.

These state regulations limit emissions to 0.05 lb/million Btu for particulates with no more than 0.02 lb/million Btu for fine particles less than 2 microns aerodynamic diameter; and 0.34 lb/million Btu for sulfur dioxide; and 0.45 lb/million Btu for nitrogen dioxide.

Public Service Company of New Mexico proposes to limit SO_2 emissions with 90 percent SO_2 removal. Resultant SO_2 emissions would be well below those allowed by New Mexico regulations. Particulate emissions would be limited by 99.93 percent efficient electrostratic precipitators in addition to particulate removal through the SO_2 control system. Resultant particulate emissions would be well below those allowed by New Mexico regulations. NO_x emissions will be controlled through plant design and combustion modification to meet the New Mexico regulation.

12.3.2 Other Mitigating Measures

Fugitive dust may be minimized by watering at transfer points, such as conveyor ends or loading stations and coal storage piles. Attention to cleanliness and accidental spill prevention would reduce fugitive dust emissions.

The sulfur dioxide, nitrogen oxides, and particulate emissions from the coal-fired steam electric station are required to be controlled using the best available control technology. The sulfur dioxide is controlled by coal washing and flue gas desulfurization (scrubbers). Oxides of nitrogen can be reduced by flue gas recirculation, and other combustion modificators.

Fly ash is generally minimized by the installation and operation of electrostatic precipitators. Much of trace elements released from the combustion of the coal will appear in the fly ash and bottom ash and the scrubber waste of the power plant.

SO_2 emissions resulting from coal-fired power plants may be minimized by using the best available scrubber technology. Careful attention to standards possibly coupled with a monitoring program would help minimize violations. Power plants should minimize non-methane hydrocarbons emissions by an intensive operational and maintenance program on boilers.

12.4 Unavoidable Adverse Air Quality Impacts of the Proposed and Possible Future Actions

The increase of the emissions of particulates, sulfur dioxide, nitrogen oxides, and hydrocarbons would be unavoidable although they would be controlled. The fugitive dust released from the construction and operation of the coal-fired steam electric station and distribution lines would be controlled with dust suppression system and other procedures including land reclamation and revegetation, wetting of road surfaces, and special blasting techniques. Fugitive dust emission from off-road vehicles, and construction related vehicles would be unavoidable although they would be rigorously controlled by watering.

The best available control technology would be applied to control sulfur dioxide, nitrogen oxides, and particulate emissions from the steam electric stations. Even though these emissions would be at or below the federal and state standards, they would have an adverse atmospheric impact. The combustion of coal also releases trace elements and radionuclides at very low levels. Some of these substances appear in the bottom ash,

fly ash, and scrubber waste of the steam electric station. The resultant ground level concentrations of the trace elements and radionuclides would be near the geogenic levels. The ecological pathways of these substances are not well known.

12.5 Relationship Between Short-term Uses and Long-term Productivity of the Air Quality

Construction of power lines, coal handling facilities, and the coal-fired electric station would be a temporary source of fugitive particulates. These fugitive emissions and the aerosol formed in the atmosphere from sulfur dioxide, nitrogen oxide, and hydrocarbons would reduce visibility. Because the residence time of particulates in the atmosphere ranges from a few hours to a few days, the emissions are not expected to cause a long-term impact. If, however, the reclamation and revegetation of the area disturbed by construction is not equivalent to current vegetation and surface contours, pollutant dispersion patterns in the area would be permanently altered. Construction of power lines, coal handling facilities, and coal-fired electric station would be a temporary source of fugitive particulates.

A loss of visibility would occur from the very fine particulate emissions and the aerosol formed in the atmosphere from sulfur dioxide, nitrogen oxides, and hydrocarbons. However, the decrease in regional visibility is not anticipated to be significant.

12.6 Irreversible or Irretrievable Commitment of Air Quality

The redistribution of material from the construction of the transmission lines may cause a small change in the local climate. The modification of the surface contours and albedo would

irreversibly alter the local air flow fields and surface heating of the atmosphere. As a result, localized pollutant dispersion patterns and pollutant concentrations may be irreversibly altered. If reclamation and revegetation were complete, the air quality impact of the mines would be reversible.